

```
In [1]: A=10
```

```
In [2]: b=10.0
```

```
In [3]: A
```

```
Out[3]: 10
```

```
In [4]: b
```

```
Out[4]: 10.0
```

```
In [5]: 10+20-30*2
```

```
Out[5]: -30
```

```
In [6]: str="hello welcome"
```

```
In [7]: str
```

```
Out[7]: 'hello welcome'
```

```
In [8]: str='hello'
```

```
In [9]: str
```

```
Out[9]: 'hello'
```

```
In [10]: str[0]
```

```
Out[10]: 'h'
```

```
In [11]: str[1]="x"
```

```
-----  
TypeError                                Traceback (most recent call last)  
~\AppData\Local\Temp\ipykernel_24744\1748201077.py in <module>  
----> 1 str[1]="x"  
  
TypeError: 'str' object does not support item assignment
```

```
In [12]: str[1]
```

```
Out[12]: 'e'
```

```
In [13]: len(str)
```

```
Out[13]: 5
```

```
In [14]: str[-1]
```

```
Out[14]: 'o'
```

```
In [15]: str="hello welcome"
```

```
In [16]: str[-1]
```

```
Out[16]: 'e'
```

```
In [17]: str[12]
```

```
Out[17]: 'e'
```

```
In [18]: len(str)
```

```
Out[18]: 13
```

```
In [19]: str[0:5]
```

```
Out[19]: 'hello'
```

```
In [20]: str[0:6]
```

```
Out[20]: 'hello '
```

```
In [21]: str[-1:-7]
```

```
Out[21]: ''
```

```
In [22]: str[-7:-1]
```

```
Out[22]: 'welcom'
```

```
In [23]: str[-8:-1]
```

```
Out[23]: ' welcom'
```

```
In [24]: str[-7:0]
```

```
Out[24]: ''
```

```
In [25]: str[-7::]
```

```
Out[25]: 'welcome'
```

```
In [26]: str[::-9]
```

```
Out[26]: 'el'
```

```
In [27]: str[-13:-10]
```

```
Out[27]: 'hel'
```

```
In [28]: str[-13:-8]
```

```
Out[28]: 'hello'
```

```
In [1]: str[-7::]
```

```
-----  
TypeError                                Traceback (most recent call last)  
~\AppData\Local\Temp\ipykernel_7024\1707737961.py in <module>  
----> 1 str[-7::]
```

```
TypeError: 'type' object is not subscriptable
```

```
In [2]: str="Hello welcome you all"
```

```
In [3]: str
```

```
Out[3]: 'Hello welcome you all'
```

```
In [4]: print(str)
```

```
Hello welcome you all
```

```
In [5]: str*2
```

```
Out[5]: 'Hello welcome you allHello welcome you all'
```

```
In [6]: str*4
```

```
Out[6]: 'Hello welcome you allHello welcome you allHello welcome you allHello welcome you a  
ll'
```

```
In [7]: len(str)
```

```
Out[7]: 21
```

```
In [8]: str.find('hel')
```

```
Out[8]: -1
```

```
In [9]: str.find('Hello')
```

```
Out[9]: 0
```

```
In [10]: str.find('Hel')
```

```
Out[10]: 0
```

```
In [11]: str.find('come')
```

```
Out[11]: 9
```

```
In [12]: str.find('welcome')
```

```
Out[12]: 6
```

```
In [13]: str.find('cse')
```

```
Out[13]: -1
```

```
In [14]: str.upper()
```

```
Out[14]: 'HELLO WELCOME YOU ALL'
```

```
In [15]: str.lower()
```

```
Out[15]: 'hello welcome you all'
```

```
In [16]: str[-3::]
```

```
Out[16]: 'all'
```

```
In [17]: str[0:2:]
```

```
Out[17]: 'He'
```

```
In [18]: str[0::2]
```

```
Out[18]: 'Hlowloeyual'
```

```
In [19]: str[::-1]
```

```
Out[19]: 'lla uoy emoclew olleH'
```

```
In [20]: str in 'Hello'
```

```
Out[20]: False
```

```
In [21]: str
```

```
Out[21]: 'Hello welcome you all'
```

```
In [22]: 'Hello' in str
```

```
Out[22]: True
```

```
In [23]: 'welcome' in str
```

```
Out[23]: True
```

```
In [24]: 'hello' in str
```

```
Out[24]: False
```

```
In [26]: str[2:len(str)-4+4+2-3*2-15]
```

```
Out[26]: ''
```

```
In [30]: for i in range(1,11):  
         print(i)
```

```
1  
2  
3  
4  
5  
6  
7  
8  
9  
10
```

```
In [29]: for i in range(1,26):  
         print(i,end=' ')
```

```
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25
```

```
In [31]: for i in range(1,11):  
         if i%2!=0:  
             print(i,end=' ')
```

```
1 3 5 7 9
```

```
In [32]: for i in range(1,11,2):  
         print(i)
```

```
1  
3  
5  
7  
9
```

```
In [33]: for i in range(2,11,2):  
         print(i)
```

```
2  
4  
6  
8  
10
```

```
In [35]: for i in range(5,101,5):  
         print(i,end=' ')
```

```
5 10 15 20 25 30 35 40 45 50 55 60 65 70 75 80 85 90 95 100
```

```
In [36]: l1=[12,15,39.54,'hello',[12,39,25,[34,'welcome',55],'cse']]
```

```
In [37]: 11
```

```
Out[37]: [12, 15, 39.54, 'hello', [12, 39, 25, [34, 'welcome', 55], 'cse']]
```

```
In [38]: 11[0]
```

```
Out[38]: 12
```

```
In [39]: 11[3]
```

```
Out[39]: 'hello'
```

```
In [40]: 11[4]
```

```
Out[40]: [12, 39, 25, [34, 'welcome', 55], 'cse']
```

```
In [43]: 11[4]
```

```
Out[43]: [12, 39, 25, [34, 'welcome', 55], 'cse']
```

```
In [44]: 11[4][3]
```

```
Out[44]: [34, 'welcome', 55]
```

```
In [45]: 11[4][3][1]
```

```
Out[45]: 'welcome'
```

```
In [47]: 11[4][3][1][3:]
```

```
Out[47]: 'come'
```

```
In [50]: 11[4][4]
```

```
Out[50]: 'cse'
```

```
In [51]: str
```

```
Out[51]: 'Hello welcome you all'
```

```
In [52]: str1="cse"  
print(str1)
```

```
cse
```

```
In [53]: str+str1
```

```
Out[53]: 'Hello welcome you allcse'
```

```
In [54]: str.replace('welcome',str1)
```

```
Out[54]: 'Hello cse you all'
```

```
str
```

```
In [55]: str
```

```
Out[55]: 'Hello welcome you all'
```

```
In [56]: l1
```

```
Out[56]: [12, 15, 39.54, 'hello', [12, 39, 25, [34, 'welcome', 55], 'cse']]
```

```
In [64]: l1[4][3][1]='come'
```

```
In [65]: l1
```

```
Out[65]: [12, 15, 39.54, 'hello', [12, 39, 25, [34, 'come', 55], 'cse']]
```

```
In [66]: l1.append('welcome')
```

```
In [67]: l1
```

```
Out[67]: [12, 15, 39.54, 'hello', [12, 39, 25, [34, 'come', 55], 'cse'], 'welcome']
```

```
In [70]: l1.insert(4,'welcome')
```

```
In [72]: l1
```

```
Out[72]: [12,
          15,
          39.54,
          'welcome',
          'welcome',
          'hello',
          [12, 39, 25, [34, 'come', 55], 'cse'],
          'welcome']
```

```
In [80]: l1.remove('welcome')
print(l1)
```

```
[12, 15, 39.54, 'hello']
```

```
In [75]: l1.pop()
```

```
Out[75]: [12, 39, 25, [34, 'come', 55], 'cse']
```

```
In [81]: l1
```

```
Out[81]: [12, 15, 39.54, 'hello']
```

```
In [82]: l1[2]
```

```
Out[82]: 39.54
```

```
In [83]: print(39.54-39)
```

```
0.53999999999999991
```

```
In [84]: l1.remove(39.54)
```

```
In [85]: l1
```

```
Out[85]: [12, 15, 'hello']
```

```
In [86]: l1.insert(2,0.54)
```

```
In [87]: l1
```

```
Out[87]: [12, 15, 0.54, 'hello']
```

```
In [88]: str
```

```
Out[88]: 'Hello welcome you all'
```

```
In [95]: str.split(' ',3)
```

```
Out[95]: ['Hello', 'welcome', 'you', 'all']
```

```
In [104]: dict={'name':'bhav','address':"chennai",'mob no':9360050262}  
print(dict)
```

```
{'name': 'bhav', 'address': 'chennai', 'mob no': 9360050262}
```

```
In [97]: dict
```

```
Out[97]: {'name': 'bhav', 'address': 'chennai', 'mob no': 9360050262}
```

```
In [98]: set={0,0,9}
```

```
In [99]: set
```

```
Out[99]: {0, 9}
```

```
In [100]: dict['name']
```

```
Out[100]: 'bhav'
```

```
In [102]: dict['mob no']
```

```
Out[102]: 9360050262
```

```
In [105]: len(dict)
```

```
Out[105]: 3
```



```
In [106]: dict1=dict.copy()
```

```
In [107]: dict1
```

```
Out[107]: {'name': 'bhav', 'address': 'chennai', 'mob no': 9360050262}
```

```
In [108]: dict2=dict1.copy()
```

```
In [109]: dict2
```

```
Out[109]: {'name': 'bhav', 'address': 'chennai', 'mob no': 9360050262}
```

```
In [110]: dict.values()
```

```
Out[110]: dict_values(['bhav', 'chennai', 9360050262])
```

```
In [111]: dict1['address']
```

```
Out[111]: 'chennai'
```

```
In [112]: dict.keys()
```

```
Out[112]: dict_keys(['name', 'address', 'mob no'])
```

```
In [ ]:
```

```
In [1]: for i in range(1,21):  
        print(i,end=' ')
```

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20

```
In [2]: for i in range(1,21,2):  
        print(i,end=' ')
```

1 3 5 7 9 11 13 15 17 19

```
In [3]: for i in range(2,21,2):  
        print(i,end=' ')
```

2 4 6 8 10 12 14 16 18 20

```
In [4]: for i in range(0,50,5):  
        print(i,end=' ')
```

0 5 10 15 20 25 30 35 40 45

```
In [7]: i=0  
while(i<10):  
    print("Welcome",end=' ')  
    i+=1
```

Welcome Welcome Welcome Welcome Welcome Welcome Welcome Welcome Welcome Welcome

```
In [8]: str="Welcome"
```

```
In [9]: str
```

```
Out[9]: 'Welcome'
```

```
In [10]: def toprint():  
          print(str)  
          return  
toprint()
```

Welcome

```
In [12]: def toprint(str):  
          print(str)  
          return  
toprint(str)
```

Welcome

```
In [13]: a=10  
def toprint(str,a):  
    print(str*a)  
    return  
toprint(str,a)
```

WelcomeWelcomeWelcomeWelcomeWelcomeWelcomeWelcomeWelcomeWelcomeWelcome

```
In [16]: a=10
def toprint(str):
    print(str*a,end=' ')
    return
toprint(str)
```

WelcomeWelcomeWelcomeWelcomeWelcomeWelcomeWelcomeWelcomeWelcomeWelcome

```
In [17]: import numpy as np
```

```
In [18]: a=np.array([1,2,3,4,5,6])
```

```
In [19]: print(a)
```

[1 2 3 4 5 6]

```
In [20]: a
```

```
Out[20]: array([1, 2, 3, 4, 5, 6])
```

```
In [21]: a.ndim
```

```
Out[21]: 1
```

```
In [22]: b=np.array([[1,2,3],[4,5,6],[7,8,9]])
```

```
In [23]: print(b)
```

[[1 2 3]  
 [4 5 6]  
 [7 8 9]]

```
In [24]: b.ndim
```

```
Out[24]: 2
```

```
In [25]: c=np.arange(10,30)
```

```
In [26]: print(c)
```

[10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29]

```
In [27]: d=np.arange(10,31,2)
```

```
In [33]: print(d)
```

[[10 12 14 16 18]  
 [20 22 24 26 28]]

```
In [34]: e=np.arange(10,30,2)
```

```
In [38]: print(e)
```

```
[10 12 14 16 18 20 22 24 26 28 30]
```

```
In [39]: print(e)
```

```
[10 12 14 16 18 20 22 24 26 28 30]
```

```
In [40]: e=np.arange(10,29,2)
```

```
In [41]: print(e)
```

```
[10 12 14 16 18 20 22 24 26 28]
```

```
In [43]: e.shape=(2,5)
```

```
In [44]: print(e)
```

```
[[10 12 14 16 18]
 [20 22 24 26 28]]
```

```
In [45]: e.ndim
```

```
Out[45]: 2
```

```
In [46]: x=np.empty([3,2],dtype=int)
```

```
In [47]: print(x)
```

```
[[ -1985522336      384]
 [           0           0]
 [           1 -2147483648]]
```

```
In [48]: x=np.zeros(10)
```

```
In [49]: print(x)
```

```
[0.  0.  0.  0.  0.  0.  0.  0.  0.  0.]
```

```
In [50]: x=np.ones(10)
print(x)
```

```
[1.  1.  1.  1.  1.  1.  1.  1.  1.  1.]
```

```
In [51]: y=np.array([[1,2,3,4],[5,6,7,8],[9,10,11,12],[13,14,15,16]])
```

In [52]: `print(y)`

```
[[ 1  2  3  4]
 [ 5  6  7  8]
 [ 9 10 11 12]
 [13 14 15 16]]
```

In [53]: `y.ndim`

Out[53]: 2

In [54]: `y[0]`

Out[54]: `array([1, 2, 3, 4])`

In [55]: `y[1]`

Out[55]: `array([5, 6, 7, 8])`

In [56]: `y[1:3]`

Out[56]: `array([[ 5, 6, 7, 8],
 [ 9, 10, 11, 12]])`

In [57]: `y[0:1]`

Out[57]: `array([[1, 2, 3, 4]])`

In [58]: `y[2][2]`

Out[58]: 11

In [59]: `y[3][1:]`

Out[59]: `array([14, 15, 16])`

In [60]: `y[:,1]`

Out[60]: `array([ 2, 6, 10, 14])`

In [61]: `y[:,2]`

Out[61]: `array([ 3, 7, 11, 15])`

In [62]: `y[:,0]`

Out[62]: `array([ 1, 5, 9, 13])`

In [63]: `y[:,2:4]`

Out[63]: `array([[ 3, 4],
 [ 7, 8],
 [11, 12],
 [15, 16]])`

```
In [64]: y[1:3,0:3]
```

```
Out[64]: array([[ 5,  6,  7],  
               [ 9, 10, 11]])
```

```
In [65]: y[0:2,0:2]
```

```
Out[65]: array([[1, 2],  
               [5, 6]])
```

```
In [66]: y[2:4,2:4]
```

```
Out[66]: array([[11, 12],  
               [15, 16]])
```

```
In [67]: z=y  
print(y)
```

```
[[ 1  2  3  4]  
 [ 5  6  7  8]  
 [ 9 10 11 12]  
 [13 14 15 16]]
```

```
In [ ]:
```

```
In [29]: import numpy as np
```

```
In [30]: a=np.array([[1,2,3],[4,5,6]])
```

```
In [31]: a.T
```

```
Out[31]: array([[1, 4],  
               [2, 5],  
               [3, 6]])
```

```
In [32]: a[1]
```

```
Out[32]: array([4, 5, 6])
```

```
In [33]: a[:,1]
```

```
Out[33]: array([2, 5])
```

```
In [34]: a
```

```
Out[34]: array([[1, 2, 3],  
               [4, 5, 6]])
```

```
In [35]: b=a
```

```
In [36]: print(a)
```

```
[[1 2 3]  
 [4 5 6]]
```

```
In [37]: print(a+b)
```

```
[[ 2  4  6]  
 [ 8 10 12]]
```

```
In [38]: np.add(a,b)
```

```
Out[38]: array([[ 2,  4,  6],  
               [ 8, 10, 12]])
```

```
In [39]: print(np.add(a,b))
```

```
[[ 2  4  6]  
 [ 8 10 12]]
```

```
In [40]: print(a-b)
```

```
[[0 0 0]  
 [0 0 0]]
```

```
In [41]: print(np.subtract(a,b))
```

```
[[0 0 0]
 [0 0 0]]
```

```
In [42]: print(a*b)
```

```
[[ 1  4  9]
 [16 25 36]]
```

```
In [43]: np.multiply(a,b)
```

```
Out[43]: array([[ 1,  4,  9],
                [16, 25, 36]])
```

```
In [44]: print(a//b)
```

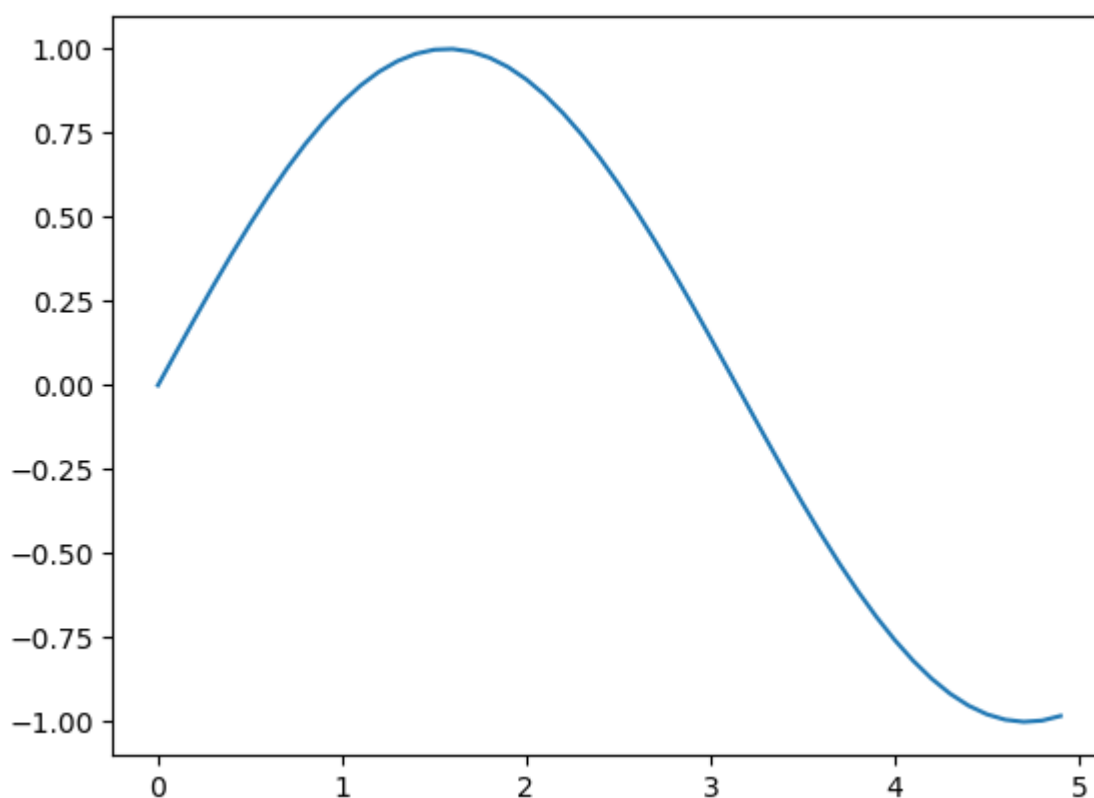
```
[[1 1 1]
 [1 1 1]]
```

```
In [45]: np.sqrt(a)
```

```
Out[45]: array([[1.          , 1.41421356, 1.73205081],
                [2.          , 2.23606798, 2.44948974]])
```

```
In [46]: import matplotlib.pyplot as plt
```

```
In [47]: x=np.arange(0,5,0.1)
y=np.sin(x)
plt.plot(x,y)
plt.show()
```

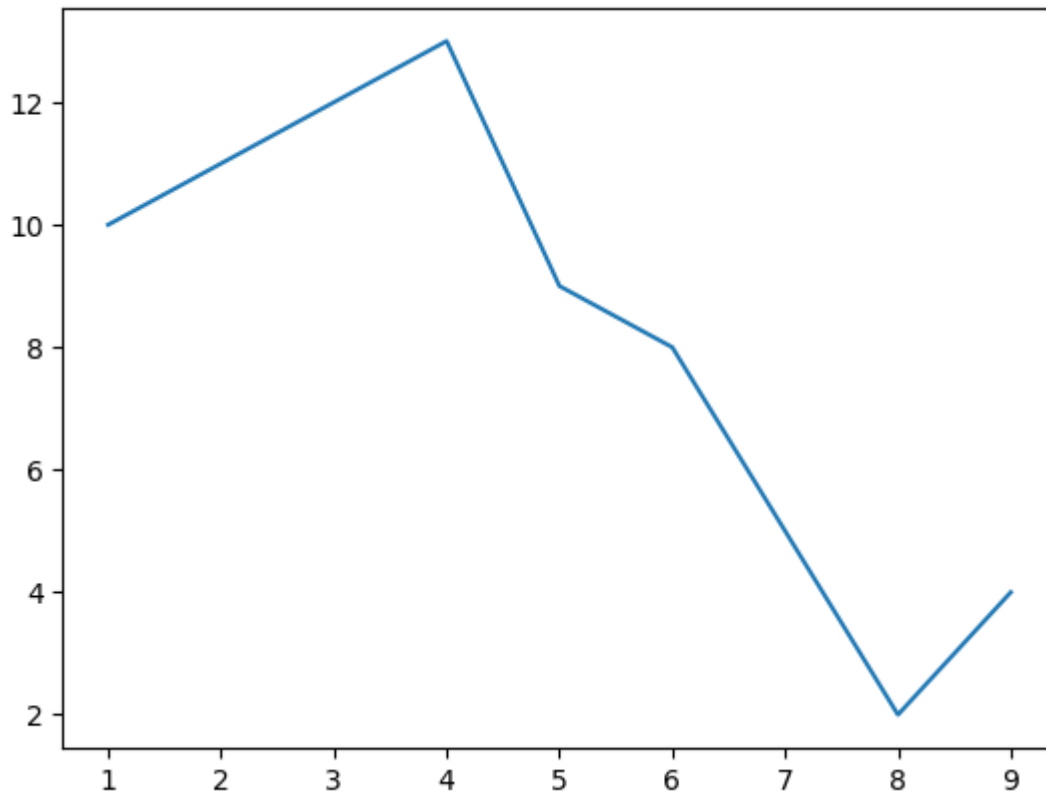




```
In [48]: print(x)
```

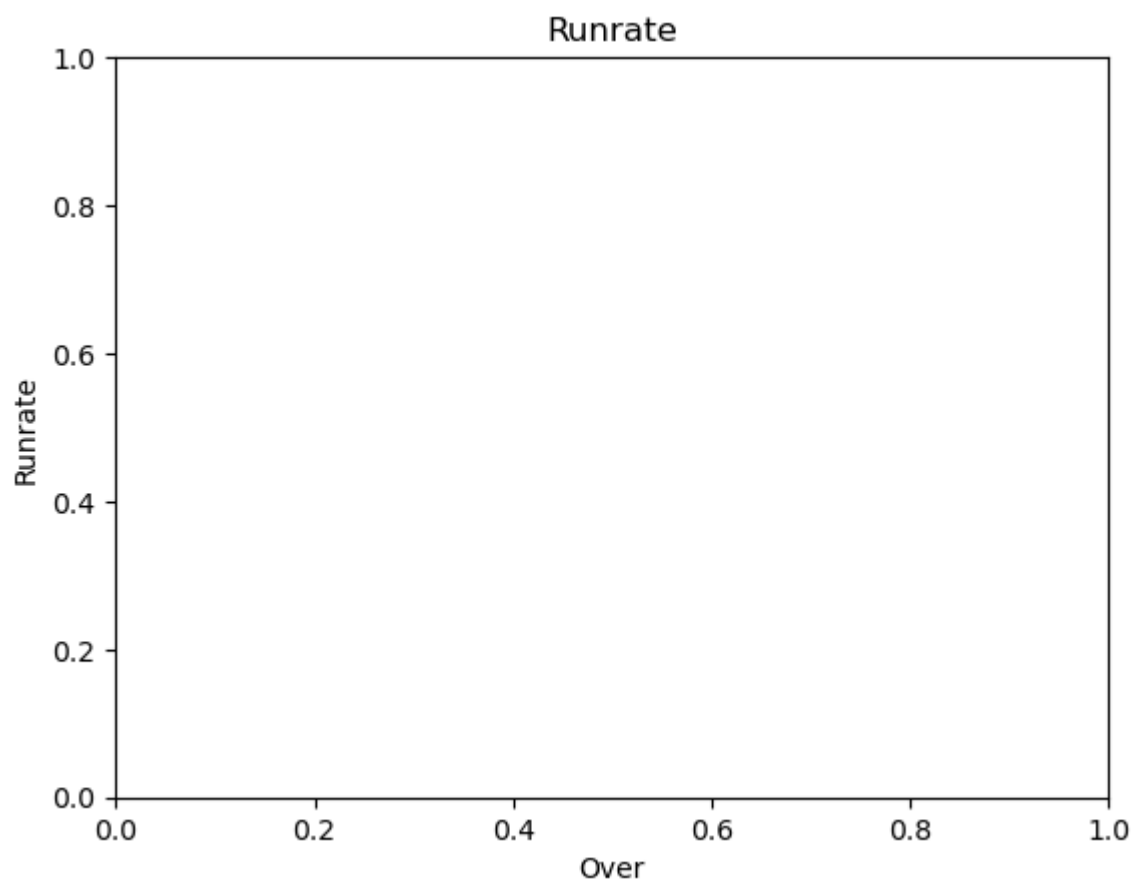
```
[0.  0.1 0.2 0.3 0.4 0.5 0.6 0.7 0.8 0.9 1.  1.1 1.2 1.3 1.4 1.5 1.6 1.7
 1.8 1.9 2.  2.1 2.2 2.3 2.4 2.5 2.6 2.7 2.8 2.9 3.  3.1 3.2 3.3 3.4 3.5
 3.6 3.7 3.8 3.9 4.  4.1 4.2 4.3 4.4 4.5 4.6 4.7 4.8 4.9]
```

```
In [49]: a=[1,2,3,4,5,6,7,8,9]
India=[10,11,12,13,9,8,5,2,4]
Aus=[10,20,30,40,50,60,70,80,90]
plt.plot(a,India)
plt.show()
```



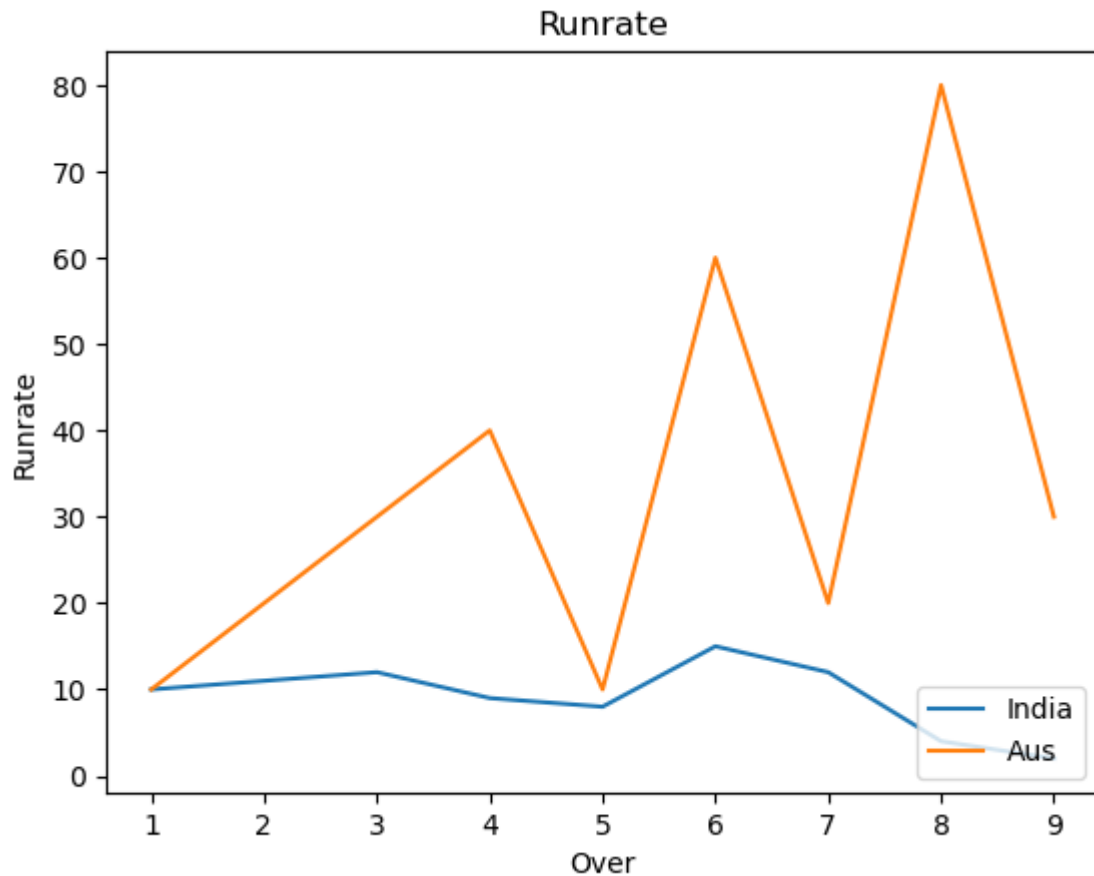
```
In [50]:
```

```
plt.title("Runrate")  
plt.xlabel("Over")  
plt.ylabel("Runrate")  
plt.show()
```



```
In [51]: a=[1,2,3,4,5,6,7,8,9]
India=[10,11,12,9,8,15,12,4,2]
Aus=[10,20,30,40,10,60,20,80,30]
plt.plot(a,India)
plt.plot(a,Aus)
plt.legend(["India", "Aus"], loc ="lower right")

plt.title("Runrate")
plt.xlabel("Over")
plt.ylabel("Runrate")
plt.show()
```



```
In [52]: import pandas as pd
```

```
In [53]: ds=pd.read_csv('D:\president_heights.csv')
```

```
In [54]: ds.info
```

```
Out[54]: <bound method DataFrame.info of          order          name  height(cm)
0           1  George Washington      189
1           2      John Adams      170
2           3  Thomas Jefferson      189
3           4    James Madison      163
4           5    James Monroe      183
5           6  John Quincy Adams      171
6           7    Andrew Jackson      185
7           8    Martin Van Buren      168
8           9  William Henry Harrison      173
9          10      John Tyler      183
10         11    James K. Polk      173
11         12    Zachary Taylor      173
12         13    Millard Fillmore      175
13         14    Franklin Pierce      178
14         15    James Buchanan      183
15         16    Abraham Lincoln      193
16         17    Andrew Johnson      178
17         18    Ulysses S. Grant      173
18         19    Rutherford B. Hayes      174
19         20    James A. Garfield      183
20         21    Chester A. Arthur      183
21         23    Benjamin Harrison      168
22         25    William McKinley      170
23         26    Theodore Roosevelt      178
24         27    William Howard Taft      182
25         28    Woodrow Wilson      180
26         29    Warren G. Harding      183
27         30    Calvin Coolidge      178
28         31    Herbert Hoover      182
29         32    Franklin D. Roosevelt      188
30         33    Harry S. Truman      175
31         34    Dwight D. Eisenhower      179
32         35    John F. Kennedy      183
33         36    Lyndon B. Johnson      193
34         37    Richard Nixon      182
35         38    Gerald Ford      183
36         39    Jimmy Carter      177
37         40    Ronald Reagan      185
38         41    George H. W. Bush      188
39         42    Bill Clinton      188
40         43    George W. Bush      182
41         44    Barack Obama      185>
```

```
In [55]: ds.dtypes
```

```
Out[55]: order          int64
name          object
height(cm)    int64
dtype: object
```

```
In [56]: ds1=ds
```

```
In [57]: print(ds1)
```

	order	name	height(cm)
0	1	George Washington	189
1	2	John Adams	170
2	3	Thomas Jefferson	189
3	4	James Madison	163
4	5	James Monroe	183
5	6	John Quincy Adams	171
6	7	Andrew Jackson	185
7	8	Martin Van Buren	168
8	9	William Henry Harrison	173
9	10	John Tyler	183
10	11	James K. Polk	173
11	12	Zachary Taylor	173
12	13	Millard Fillmore	175
13	14	Franklin Pierce	178
14	15	James Buchanan	183
15	16	Abraham Lincoln	193
16	17	Andrew Johnson	178
17	18	Ulysses S. Grant	173
18	19	Rutherford B. Hayes	174
19	20	James A. Garfield	183
20	21	Chester A. Arthur	183
21	23	Benjamin Harrison	168
22	25	William McKinley	170
23	26	Theodore Roosevelt	178
24	27	William Howard Taft	182
25	28	Woodrow Wilson	180
26	29	Warren G. Harding	183
27	30	Calvin Coolidge	178
28	31	Herbert Hoover	182
29	32	Franklin D. Roosevelt	188
30	33	Harry S. Truman	175
31	34	Dwight D. Eisenhower	179
32	35	John F. Kennedy	183
33	36	Lyndon B. Johnson	193
34	37	Richard Nixon	182
35	38	Gerald Ford	183
36	39	Jimmy Carter	177
37	40	Ronald Reagan	185
38	41	George H. W. Bush	188
39	42	Bill Clinton	188
40	43	George W. Bush	182
41	44	Barack Obama	185

```
In [58]: ds1.head()
```

Out[58]:

	order	name	height(cm)
0	1	George Washington	189
1	2	John Adams	170
2	3	Thomas Jefferson	189
3	4	James Madison	163
4	5	James Monroe	183

In [59]: ds1.tail()

Out[59]:

	order	name	height(cm)
37	40	Ronald Reagan	185
38	41	George H. W. Bush	188
39	42	Bill Clinton	188
40	43	George W. Bush	182
41	44	Barack Obama	185

```
In [60]: ds1
```

Out[60]:

	order	name	height(cm)
0	1	George Washington	189
1	2	John Adams	170
2	3	Thomas Jefferson	189
3	4	James Madison	163
4	5	James Monroe	183
5	6	John Quincy Adams	171
6	7	Andrew Jackson	185
7	8	Martin Van Buren	168
8	9	William Henry Harrison	173
9	10	John Tyler	183
10	11	James K. Polk	173
11	12	Zachary Taylor	173
12	13	Millard Fillmore	175
13	14	Franklin Pierce	178
14	15	James Buchanan	183
15	16	Abraham Lincoln	193
16	17	Andrew Johnson	178
17	18	Ulysses S. Grant	173
18	19	Rutherford B. Hayes	174
19	20	James A. Garfield	183
20	21	Chester A. Arthur	183
21	23	Benjamin Harrison	168
22	25	William McKinley	170
23	26	Theodore Roosevelt	178
24	27	William Howard Taft	182
25	28	Woodrow Wilson	180
26	29	Warren G. Harding	183
27	30	Calvin Coolidge	178
28	31	Herbert Hoover	182
29	32	Franklin D. Roosevelt	188
30	33	Harry S. Truman	175
31	34	Dwight D. Eisenhower	179
32	35	John F. Kennedy	183
33	36	Lyndon B. Johnson	193
34	37	Richard Nixon	182
35	38	Gerald Ford	183
36	39	Jimmy Carter	177
37	40	Ronald Reagan	185
38	41	George H. W. Bush	188
39	42	Bill Clinton	188
40	43	George W. Bush	182



	order	name	height(cm)
41	44	Barack Obama	185

In [61]: `ds1.iloc[35]`

Out[61]:

order	38
name	Gerald Ford
height(cm)	183

Name: 35, dtype: object

In [62]: `ds1.iloc[35:39]`

Out[62]:

	order	name	height(cm)
35	38	Gerald Ford	183
36	39	Jimmy Carter	177
37	40	Ronald Reagan	185
38	41	George H. W. Bush	188

In [63]: `ds1.describe()`

Out[63]:

	order	height(cm)
count	42.000000	42.000000
mean	22.476190	179.738095
std	13.152461	7.015869
min	1.000000	163.000000
25%	11.250000	174.250000
50%	22.000000	182.000000
75%	33.750000	183.000000
max	44.000000	193.000000

In [64]: `ds1['order'].describe()`

Out[64]:

count	42.000000
mean	22.476190
std	13.152461
min	1.000000
25%	11.250000
50%	22.000000
75%	33.750000
max	44.000000

Name: order, dtype: float64

In [65]: `subset=ds1[['order', 'name']]`

```
In [66]: print(subset)
```

	order	name
0	1	George Washington
1	2	John Adams
2	3	Thomas Jefferson
3	4	James Madison
4	5	James Monroe
5	6	John Quincy Adams
6	7	Andrew Jackson
7	8	Martin Van Buren
8	9	William Henry Harrison
9	10	John Tyler
10	11	James K. Polk
11	12	Zachary Taylor
12	13	Millard Fillmore
13	14	Franklin Pierce
14	15	James Buchanan
15	16	Abraham Lincoln
16	17	Andrew Johnson
17	18	Ulysses S. Grant
18	19	Rutherford B. Hayes
19	20	James A. Garfield
20	21	Chester A. Arthur
21	23	Benjamin Harrison
22	25	William McKinley
23	26	Theodore Roosevelt
24	27	William Howard Taft
25	28	Woodrow Wilson
26	29	Warren G. Harding
27	30	Calvin Coolidge
28	31	Herbert Hoover
29	32	Franklin D. Roosevelt
30	33	Harry S. Truman
31	34	Dwight D. Eisenhower
32	35	John F. Kennedy
33	36	Lyndon B. Johnson
34	37	Richard Nixon
35	38	Gerald Ford
36	39	Jimmy Carter
37	40	Ronald Reagan
38	41	George H. W. Bush
39	42	Bill Clinton
40	43	George W. Bush
41	44	Barack Obama

In [67]: subset

Out[67]:

	order	name
0	1	George Washington
1	2	John Adams
2	3	Thomas Jefferson
3	4	James Madison
4	5	James Monroe
5	6	John Quincy Adams
6	7	Andrew Jackson
7	8	Martin Van Buren
8	9	William Henry Harrison
9	10	John Tyler
10	11	James K. Polk
11	12	Zachary Taylor
12	13	Millard Fillmore
13	14	Franklin Pierce
14	15	James Buchanan
15	16	Abraham Lincoln
16	17	Andrew Johnson
17	18	Ulysses S. Grant
18	19	Rutherford B. Hayes
19	20	James A. Garfield
20	21	Chester A. Arthur
21	23	Benjamin Harrison
22	25	William McKinley
23	26	Theodore Roosevelt
24	27	William Howard Taft
25	28	Woodrow Wilson
26	29	Warren G. Harding
27	30	Calvin Coolidge
28	31	Herbert Hoover
29	32	Franklin D. Roosevelt
30	33	Harry S. Truman
31	34	Dwight D. Eisenhower
32	35	John F. Kennedy
33	36	Lyndon B. Johnson
34	37	Richard Nixon
35	38	Gerald Ford
36	39	Jimmy Carter
37	40	Ronald Reagan
38	41	George H. W. Bush
39	42	Bill Clinton
40	43	George W. Bush

order		name
41	44	Barack Obama

In [68]: `del subset['order']`

In [69]: subset

Out[69]:

	name
0	George Washington
1	John Adams
2	Thomas Jefferson
3	James Madison
4	James Monroe
5	John Quincy Adams
6	Andrew Jackson
7	Martin Van Buren
8	William Henry Harrison
9	John Tyler
10	James K. Polk
11	Zachary Taylor
12	Millard Fillmore
13	Franklin Pierce
14	James Buchanan
15	Abraham Lincoln
16	Andrew Johnson
17	Ulysses S. Grant
18	Rutherford B. Hayes
19	James A. Garfield
20	Chester A. Arthur
21	Benjamin Harrison
22	William McKinley
23	Theodore Roosevelt
24	William Howard Taft
25	Woodrow Wilson
26	Warren G. Harding
27	Calvin Coolidge
28	Herbert Hoover
29	Franklin D. Roosevelt
30	Harry S. Truman
31	Dwight D. Eisenhower
32	John F. Kennedy
33	Lyndon B. Johnson
34	Richard Nixon
35	Gerald Ford
36	Jimmy Carter
37	Ronald Reagan
38	George H. W. Bush
39	Bill Clinton
40	George W. Bush

**name**

**41**

Barack Obama



```
In [70]: ds1.rename(columns={'order': 'ordno'})
```

Out[70]:

	ordno	name	height(cm)
	0	1 George Washington	189
	1	2 John Adams	170
	2	3 Thomas Jefferson	189
	3	4 James Madison	163
	4	5 James Monroe	183
	5	6 John Quincy Adams	171
	6	7 Andrew Jackson	185
	7	8 Martin Van Buren	168
	8	9 William Henry Harrison	173
	9	10 John Tyler	183
	10	11 James K. Polk	173
	11	12 Zachary Taylor	173
	12	13 Millard Fillmore	175
	13	14 Franklin Pierce	178
	14	15 James Buchanan	183
	15	16 Abraham Lincoln	193
	16	17 Andrew Johnson	178
	17	18 Ulysses S. Grant	173
	18	19 Rutherford B. Hayes	174
	19	20 James A. Garfield	183
	20	21 Chester A. Arthur	183
	21	23 Benjamin Harrison	168
	22	25 William McKinley	170
	23	26 Theodore Roosevelt	178
	24	27 William Howard Taft	182
	25	28 Woodrow Wilson	180
	26	29 Warren G. Harding	183
	27	30 Calvin Coolidge	178
	28	31 Herbert Hoover	182
	29	32 Franklin D. Roosevelt	188
	30	33 Harry S. Truman	175
	31	34 Dwight D. Eisenhower	179
	32	35 John F. Kennedy	183
	33	36 Lyndon B. Johnson	193
	34	37 Richard Nixon	182
	35	38 Gerald Ford	183
	36	39 Jimmy Carter	177
	37	40 Ronald Reagan	185
	38	41 George H. W. Bush	188
	39	42 Bill Clinton	188
	40	43 George W. Bush	182

ordno		name	height(cm)
41	44	Barack Obama	185

```
In [71]: ds1.columns
```

```
Out[71]: Index(['order', 'name', 'height(cm)'], dtype='object')
```

In [72]: `ds1`

Out[72]:

	order	name	height(cm)
0	1	George Washington	189
1	2	John Adams	170
2	3	Thomas Jefferson	189
3	4	James Madison	163
4	5	James Monroe	183
5	6	John Quincy Adams	171
6	7	Andrew Jackson	185
7	8	Martin Van Buren	168
8	9	William Henry Harrison	173
9	10	John Tyler	183
10	11	James K. Polk	173
11	12	Zachary Taylor	173
12	13	Millard Fillmore	175
13	14	Franklin Pierce	178
14	15	James Buchanan	183
15	16	Abraham Lincoln	193
16	17	Andrew Johnson	178
17	18	Ulysses S. Grant	173
18	19	Rutherford B. Hayes	174
19	20	James A. Garfield	183
20	21	Chester A. Arthur	183
21	23	Benjamin Harrison	168
22	25	William McKinley	170
23	26	Theodore Roosevelt	178
24	27	William Howard Taft	182
25	28	Woodrow Wilson	180
26	29	Warren G. Harding	183
27	30	Calvin Coolidge	178
28	31	Herbert Hoover	182
29	32	Franklin D. Roosevelt	188
30	33	Harry S. Truman	175
31	34	Dwight D. Eisenhower	179
32	35	John F. Kennedy	183
33	36	Lyndon B. Johnson	193
34	37	Richard Nixon	182
35	38	Gerald Ford	183
36	39	Jimmy Carter	177
37	40	Ronald Reagan	185
38	41	George H. W. Bush	188
39	42	Bill Clinton	188
40	43	George W. Bush	182

order		name	height(cm)
41	44	Barack Obama	185

```
In [73]: ds1.iloc[4]
```

```
Out[73]: order          5  
         name      James Monroe  
         height(cm)    183  
         Name: 4, dtype: object
```

```
In [74]: ds1.iloc[4]=5,"James Bond",123
```

In [75]: `ds1`

Out[75]:

	order	name	height(cm)
0	1	George Washington	189
1	2	John Adams	170
2	3	Thomas Jefferson	189
3	4	James Madison	163
4	5	James Bond	123
5	6	John Quincy Adams	171
6	7	Andrew Jackson	185
7	8	Martin Van Buren	168
8	9	William Henry Harrison	173
9	10	John Tyler	183
10	11	James K. Polk	173
11	12	Zachary Taylor	173
12	13	Millard Fillmore	175
13	14	Franklin Pierce	178
14	15	James Buchanan	183
15	16	Abraham Lincoln	193
16	17	Andrew Johnson	178
17	18	Ulysses S. Grant	173
18	19	Rutherford B. Hayes	174
19	20	James A. Garfield	183
20	21	Chester A. Arthur	183
21	23	Benjamin Harrison	168
22	25	William McKinley	170
23	26	Theodore Roosevelt	178
24	27	William Howard Taft	182
25	28	Woodrow Wilson	180
26	29	Warren G. Harding	183
27	30	Calvin Coolidge	178
28	31	Herbert Hoover	182
29	32	Franklin D. Roosevelt	188
30	33	Harry S. Truman	175
31	34	Dwight D. Eisenhower	179
32	35	John F. Kennedy	183
33	36	Lyndon B. Johnson	193
34	37	Richard Nixon	182
35	38	Gerald Ford	183
36	39	Jimmy Carter	177
37	40	Ronald Reagan	185
38	41	George H. W. Bush	188
39	42	Bill Clinton	188
40	43	George W. Bush	182



order		name	height(cm)
41	44	Barack Obama	185

In [ ]:

```
In [1]: import pandas as pd
```

```
In [2]: ds=pd.read_csv('D:\president_heights.csv')
```

```
In [3]: ds.info
```

```
Out[3]: <bound method DataFrame.info of
0      1      George Washington      189
1      2      John Adams      170
2      3      Thomas Jefferson      189
3      4      James Madison      163
4      5      James Monroe      183
5      6      John Quincy Adams      171
6      7      Andrew Jackson      185
7      8      Martin Van Buren      168
8      9      William Henry Harrison      173
9     10      John Tyler      183
10    11      James K. Polk      173
11    12      Zachary Taylor      173
12    13      Millard Fillmore      175
13    14      Franklin Pierce      178
14    15      James Buchanan      183
15    16      Abraham Lincoln      193
16    17      Andrew Johnson      178
17    18      Ulysses S. Grant      173
18    19      Rutherford B. Hayes      174
19    20      James A. Garfield      183
20    21      Chester A. Arthur      183
21    23      Benjamin Harrison      168
22    25      William McKinley      170
23    26      Theodore Roosevelt      178
24    27      William Howard Taft      182
25    28      Woodrow Wilson      180
26    29      Warren G. Harding      183
27    30      Calvin Coolidge      178
28    31      Herbert Hoover      182
29    32      Franklin D. Roosevelt      188
30    33      Harry S. Truman      175
31    34      Dwight D. Eisenhower      179
32    35      John F. Kennedy      183
33    36      Lyndon B. Johnson      193
34    37      Richard Nixon      182
35    38      Gerald Ford      183
36    39      Jimmy Carter      177
37    40      Ronald Reagan      185
38    41      George H. W. Bush      188
39    42      Bill Clinton      188
40    43      George W. Bush      182
41    44      Barack Obama      185>
```

```
In [4]: ds.columns
```

```
Out[4]: Index(['order', 'name', 'height(cm)'], dtype='object')
```

```
In [7]: ds.dtypes
```

```
Out[7]: order          int64  
name          object  
height(cm)    int64  
dtype: object
```

```
In [8]: ds.describe()
```

```
Out[8]:
```

	order	height(cm)
count	42.000000	42.000000
mean	22.476190	179.738095
std	13.152461	7.015869
min	1.000000	163.000000
25%	11.250000	174.250000
50%	22.000000	182.000000
75%	33.750000	183.000000
max	44.000000	193.000000

```
In [9]: import pandas as pd  
import numpy as np  
import matplotlib.pyplot as plt
```

In [10]: ds

Out[10]:

	order	name	height(cm)
0	1	George Washington	189
1	2	John Adams	170
2	3	Thomas Jefferson	189
3	4	James Madison	163
4	5	James Monroe	183
5	6	John Quincy Adams	171
6	7	Andrew Jackson	185
7	8	Martin Van Buren	168
8	9	William Henry Harrison	173
9	10	John Tyler	183
10	11	James K. Polk	173
11	12	Zachary Taylor	173
12	13	Millard Fillmore	175
13	14	Franklin Pierce	178
14	15	James Buchanan	183
15	16	Abraham Lincoln	193
16	17	Andrew Johnson	178
17	18	Ulysses S. Grant	173
18	19	Rutherford B. Hayes	174
19	20	James A. Garfield	183
20	21	Chester A. Arthur	183
21	23	Benjamin Harrison	168
22	25	William McKinley	170
23	26	Theodore Roosevelt	178
24	27	William Howard Taft	182
25	28	Woodrow Wilson	180
26	29	Warren G. Harding	183
27	30	Calvin Coolidge	178
28	31	Herbert Hoover	182
29	32	Franklin D. Roosevelt	188
30	33	Harry S. Truman	175
31	34	Dwight D. Eisenhower	179
32	35	John F. Kennedy	183
33	36	Lyndon B. Johnson	193
34	37	Richard Nixon	182
35	38	Gerald Ford	183
36	39	Jimmy Carter	177
37	40	Ronald Reagan	185
38	41	George H. W. Bush	188
39	42	Bill Clinton	188
40	43	George W. Bush	182

order		name	height(cm)
41	44	Barack Obama	185

```
In [13]: ds.rename(columns={'height(cm)': ' Height'})
```

Out[13]:

	order	name	Height
0	1	George Washington	189
1	2	John Adams	170
2	3	Thomas Jefferson	189
3	4	James Madison	163
4	5	James Monroe	183
5	6	John Quincy Adams	171
6	7	Andrew Jackson	185
7	8	Martin Van Buren	168
8	9	William Henry Harrison	173
9	10	John Tyler	183
10	11	James K. Polk	173
11	12	Zachary Taylor	173
12	13	Millard Fillmore	175
13	14	Franklin Pierce	178
14	15	James Buchanan	183
15	16	Abraham Lincoln	193
16	17	Andrew Johnson	178
17	18	Ulysses S. Grant	173
18	19	Rutherford B. Hayes	174
19	20	James A. Garfield	183
20	21	Chester A. Arthur	183
21	23	Benjamin Harrison	168
22	25	William McKinley	170
23	26	Theodore Roosevelt	178
24	27	William Howard Taft	182
25	28	Woodrow Wilson	180
26	29	Warren G. Harding	183
27	30	Calvin Coolidge	178
28	31	Herbert Hoover	182
29	32	Franklin D. Roosevelt	188
30	33	Harry S. Truman	175
31	34	Dwight D. Eisenhower	179
32	35	John F. Kennedy	183
33	36	Lyndon B. Johnson	193
34	37	Richard Nixon	182
35	38	Gerald Ford	183
36	39	Jimmy Carter	177
37	40	Ronald Reagan	185
38	41	George H. W. Bush	188
39	42	Bill Clinton	188
40	43	George W. Bush	182



order		name	Height
41	44	Barack Obama	185

In [14]: `ds`

Out[14]:

	order	name	height(cm)
0	1	George Washington	189
1	2	John Adams	170
2	3	Thomas Jefferson	189
3	4	James Madison	163
4	5	James Monroe	183
5	6	John Quincy Adams	171
6	7	Andrew Jackson	185
7	8	Martin Van Buren	168
8	9	William Henry Harrison	173
9	10	John Tyler	183
10	11	James K. Polk	173
11	12	Zachary Taylor	173
12	13	Millard Fillmore	175
13	14	Franklin Pierce	178
14	15	James Buchanan	183
15	16	Abraham Lincoln	193
16	17	Andrew Johnson	178
17	18	Ulysses S. Grant	173
18	19	Rutherford B. Hayes	174
19	20	James A. Garfield	183
20	21	Chester A. Arthur	183
21	23	Benjamin Harrison	168
22	25	William McKinley	170
23	26	Theodore Roosevelt	178
24	27	William Howard Taft	182
25	28	Woodrow Wilson	180
26	29	Warren G. Harding	183
27	30	Calvin Coolidge	178
28	31	Herbert Hoover	182
29	32	Franklin D. Roosevelt	188
30	33	Harry S. Truman	175
31	34	Dwight D. Eisenhower	179
32	35	John F. Kennedy	183
33	36	Lyndon B. Johnson	193
34	37	Richard Nixon	182
35	38	Gerald Ford	183
36	39	Jimmy Carter	177
37	40	Ronald Reagan	185
38	41	George H. W. Bush	188
39	42	Bill Clinton	188
40	43	George W. Bush	182

order		name	height(cm)
41	44	Barack Obama	185

```
In [15]: ds.rename(columns={'height(cm)': ' Height'},inplace=True)
```

In [16]: `ds`

Out[16]:

	order	name	Height
0	1	George Washington	189
1	2	John Adams	170
2	3	Thomas Jefferson	189
3	4	James Madison	163
4	5	James Monroe	183
5	6	John Quincy Adams	171
6	7	Andrew Jackson	185
7	8	Martin Van Buren	168
8	9	William Henry Harrison	173
9	10	John Tyler	183
10	11	James K. Polk	173
11	12	Zachary Taylor	173
12	13	Millard Fillmore	175
13	14	Franklin Pierce	178
14	15	James Buchanan	183
15	16	Abraham Lincoln	193
16	17	Andrew Johnson	178
17	18	Ulysses S. Grant	173
18	19	Rutherford B. Hayes	174
19	20	James A. Garfield	183
20	21	Chester A. Arthur	183
21	23	Benjamin Harrison	168
22	25	William McKinley	170
23	26	Theodore Roosevelt	178
24	27	William Howard Taft	182
25	28	Woodrow Wilson	180
26	29	Warren G. Harding	183
27	30	Calvin Coolidge	178
28	31	Herbert Hoover	182
29	32	Franklin D. Roosevelt	188
30	33	Harry S. Truman	175
31	34	Dwight D. Eisenhower	179
32	35	John F. Kennedy	183
33	36	Lyndon B. Johnson	193
34	37	Richard Nixon	182
35	38	Gerald Ford	183
36	39	Jimmy Carter	177
37	40	Ronald Reagan	185
38	41	George H. W. Bush	188
39	42	Bill Clinton	188
40	43	George W. Bush	182

	order	name	Height
	41	44	Barack Obama
			185

In [17]: `print(ds)`

	order	name	Height
0	1	George Washington	189
1	2	John Adams	170
2	3	Thomas Jefferson	189
3	4	James Madison	163
4	5	James Monroe	183
5	6	John Quincy Adams	171
6	7	Andrew Jackson	185
7	8	Martin Van Buren	168
8	9	William Henry Harrison	173
9	10	John Tyler	183
10	11	James K. Polk	173
11	12	Zachary Taylor	173
12	13	Millard Fillmore	175
13	14	Franklin Pierce	178
14	15	James Buchanan	183
15	16	Abraham Lincoln	193
16	17	Andrew Johnson	178
17	18	Ulysses S. Grant	173
18	19	Rutherford B. Hayes	174
19	20	James A. Garfield	183
20	21	Chester A. Arthur	183
21	23	Benjamin Harrison	168
22	25	William McKinley	170
23	26	Theodore Roosevelt	178
24	27	William Howard Taft	182
25	28	Woodrow Wilson	180
26	29	Warren G. Harding	183
27	30	Calvin Coolidge	178
28	31	Herbert Hoover	182
29	32	Franklin D. Roosevelt	188
30	33	Harry S. Truman	175
31	34	Dwight D. Eisenhower	179
32	35	John F. Kennedy	183
33	36	Lyndon B. Johnson	193
34	37	Richard Nixon	182
35	38	Gerald Ford	183
36	39	Jimmy Carter	177
37	40	Ronald Reagan	185
38	41	George H. W. Bush	188
39	42	Bill Clinton	188
40	43	George W. Bush	182
41	44	Barack Obama	185

In [18]: `ds.insert(3,"Experiance","5")`

In [19]: `ds`



Out[19]:

	order	name	Height	Experiance
0	1	George Washington	189	5
1	2	John Adams	170	5
2	3	Thomas Jefferson	189	5
3	4	James Madison	163	5
4	5	James Monroe	183	5
5	6	John Quincy Adams	171	5
6	7	Andrew Jackson	185	5
7	8	Martin Van Buren	168	5
8	9	William Henry Harrison	173	5
9	10	John Tyler	183	5
10	11	James K. Polk	173	5
11	12	Zachary Taylor	173	5
12	13	Millard Fillmore	175	5
13	14	Franklin Pierce	178	5
14	15	James Buchanan	183	5
15	16	Abraham Lincoln	193	5
16	17	Andrew Johnson	178	5
17	18	Ulysses S. Grant	173	5
18	19	Rutherford B. Hayes	174	5
19	20	James A. Garfield	183	5
20	21	Chester A. Arthur	183	5
21	23	Benjamin Harrison	168	5
22	25	William McKinley	170	5
23	26	Theodore Roosevelt	178	5
24	27	William Howard Taft	182	5
25	28	Woodrow Wilson	180	5
26	29	Warren G. Harding	183	5
27	30	Calvin Coolidge	178	5
28	31	Herbert Hoover	182	5
29	32	Franklin D. Roosevelt	188	5
30	33	Harry S. Truman	175	5
31	34	Dwight D. Eisenhower	179	5
32	35	John F. Kennedy	183	5
33	36	Lyndon B. Johnson	193	5
34	37	Richard Nixon	182	5
35	38	Gerald Ford	183	5
36	39	Jimmy Carter	177	5
37	40	Ronald Reagan	185	5
38	41	George H. W. Bush	188	5
39	42	Bill Clinton	188	5
40	43	George W. Bush	182	5

order		name	Height	Experiance
41	44	Barack Obama	185	5

```
In [21]: ds.drop(columns=['Experience'])
```

Out[21]:

	order	name	Height
0	1	George Washington	189
1	2	John Adams	170
2	3	Thomas Jefferson	189
3	4	James Madison	163
4	5	James Monroe	183
5	6	John Quincy Adams	171
6	7	Andrew Jackson	185
7	8	Martin Van Buren	168
8	9	William Henry Harrison	173
9	10	John Tyler	183
10	11	James K. Polk	173
11	12	Zachary Taylor	173
12	13	Millard Fillmore	175
13	14	Franklin Pierce	178
14	15	James Buchanan	183
15	16	Abraham Lincoln	193
16	17	Andrew Johnson	178
17	18	Ulysses S. Grant	173
18	19	Rutherford B. Hayes	174
19	20	James A. Garfield	183
20	21	Chester A. Arthur	183
21	23	Benjamin Harrison	168
22	25	William McKinley	170
23	26	Theodore Roosevelt	178
24	27	William Howard Taft	182
25	28	Woodrow Wilson	180
26	29	Warren G. Harding	183
27	30	Calvin Coolidge	178
28	31	Herbert Hoover	182
29	32	Franklin D. Roosevelt	188
30	33	Harry S. Truman	175
31	34	Dwight D. Eisenhower	179
32	35	John F. Kennedy	183
33	36	Lyndon B. Johnson	193
34	37	Richard Nixon	182
35	38	Gerald Ford	183
36	39	Jimmy Carter	177
37	40	Ronald Reagan	185
38	41	George H. W. Bush	188
39	42	Bill Clinton	188
40	43	George W. Bush	182

order		name	Height
41	44	Barack Obama	185

```
In [22]: ds.drop(columns=['Experience'], inplace=True)
```

In [23]: `ds`

Out[23]:

	order	name	Height
0	1	George Washington	189
1	2	John Adams	170
2	3	Thomas Jefferson	189
3	4	James Madison	163
4	5	James Monroe	183
5	6	John Quincy Adams	171
6	7	Andrew Jackson	185
7	8	Martin Van Buren	168
8	9	William Henry Harrison	173
9	10	John Tyler	183
10	11	James K. Polk	173
11	12	Zachary Taylor	173
12	13	Millard Fillmore	175
13	14	Franklin Pierce	178
14	15	James Buchanan	183
15	16	Abraham Lincoln	193
16	17	Andrew Johnson	178
17	18	Ulysses S. Grant	173
18	19	Rutherford B. Hayes	174
19	20	James A. Garfield	183
20	21	Chester A. Arthur	183
21	23	Benjamin Harrison	168
22	25	William McKinley	170
23	26	Theodore Roosevelt	178
24	27	William Howard Taft	182
25	28	Woodrow Wilson	180
26	29	Warren G. Harding	183
27	30	Calvin Coolidge	178
28	31	Herbert Hoover	182
29	32	Franklin D. Roosevelt	188
30	33	Harry S. Truman	175
31	34	Dwight D. Eisenhower	179
32	35	John F. Kennedy	183
33	36	Lyndon B. Johnson	193
34	37	Richard Nixon	182
35	38	Gerald Ford	183
36	39	Jimmy Carter	177
37	40	Ronald Reagan	185
38	41	George H. W. Bush	188
39	42	Bill Clinton	188
40	43	George W. Bush	182

order		name	Height
41	44	Barack Obama	185

```
In [27]: ds[' Height']>=180
```

```
Out[27]: 0      True
1      False
2      True
3      False
4      True
5      False
6      True
7      False
8      False
9      True
10     False
11     False
12     False
13     False
14     True
15     True
16     False
17     False
18     False
19     True
20     True
21     False
22     False
23     False
24     True
25     True
26     True
27     False
28     True
29     True
30     False
31     False
32     True
33     True
34     True
35     True
36     False
37     True
38     True
39     True
40     True
41     True
Name: Height, dtype: bool
```



In [30]: ds[ds[' Height']>185]

Out[30]:

	order	name	Height
0	1	George Washington	189
2	3	Thomas Jefferson	189
15	16	Abraham Lincoln	193
29	32	Franklin D. Roosevelt	188
33	36	Lyndon B. Johnson	193
38	41	George H. W. Bush	188
39	42	Bill Clinton	188

In [38]: ds[((ds[' Height']>=175)&(ds[' Height']<180))]

Out[38]:

	order	name	Height
12	13	Millard Fillmore	175
13	14	Franklin Pierce	178
16	17	Andrew Johnson	178
23	26	Theodore Roosevelt	178
27	30	Calvin Coolidge	178
30	33	Harry S. Truman	175
31	34	Dwight D. Eisenhower	179
36	39	Jimmy Carter	177

In [39]: `ds.isnull()`

Out[39]:

	order	name	Height
0	False	False	False
1	False	False	False
2	False	False	False
3	False	False	False
4	False	False	False
5	False	False	False
6	False	False	False
7	False	False	False
8	False	False	False
9	False	False	False
10	False	False	False
11	False	False	False
12	False	False	False
13	False	False	False
14	False	False	False
15	False	False	False
16	False	False	False
17	False	False	False
18	False	False	False
19	False	False	False
20	False	False	False
21	False	False	False
22	False	False	False
23	False	False	False
24	False	False	False
25	False	False	False
26	False	False	False
27	False	False	False
28	False	False	False
29	False	False	False
30	False	False	False
31	False	False	False
32	False	False	False
33	False	False	False
34	False	False	False
35	False	False	False
36	False	False	False
37	False	False	False
38	False	False	False
39	False	False	False
40	False	False	False

	order	name	Height
41	False	False	False

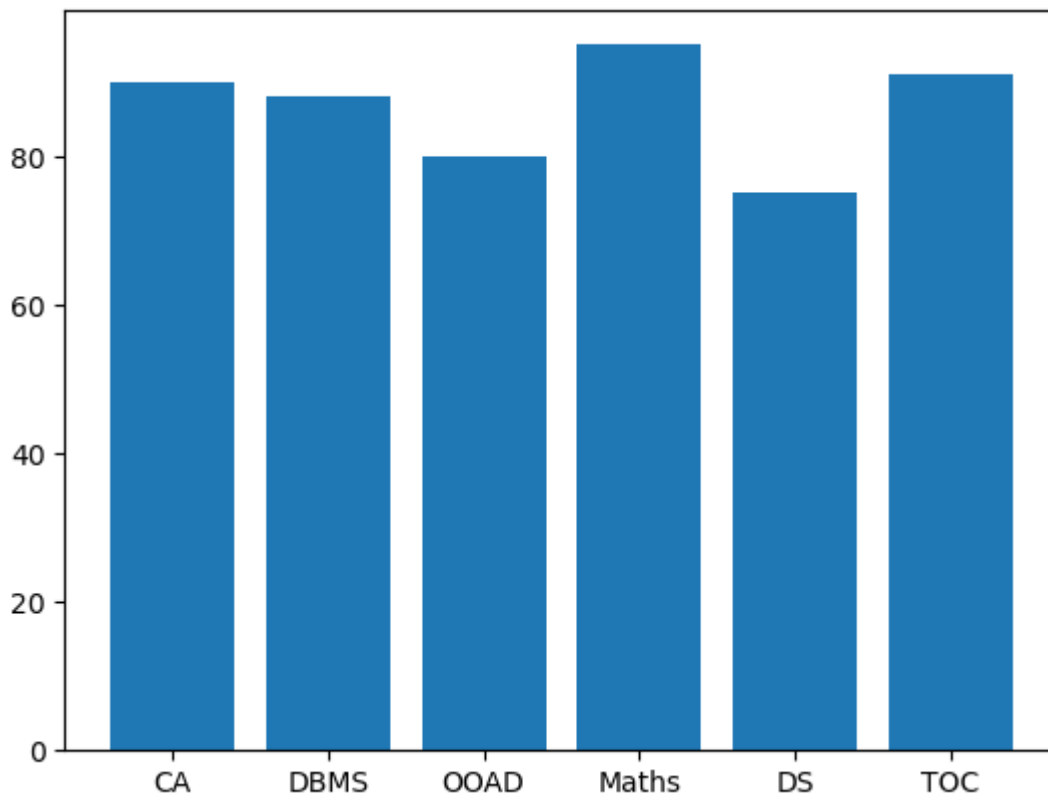
```
In [43]: sum(ds[' Height'])
```

```
Out[43]: 7549
```

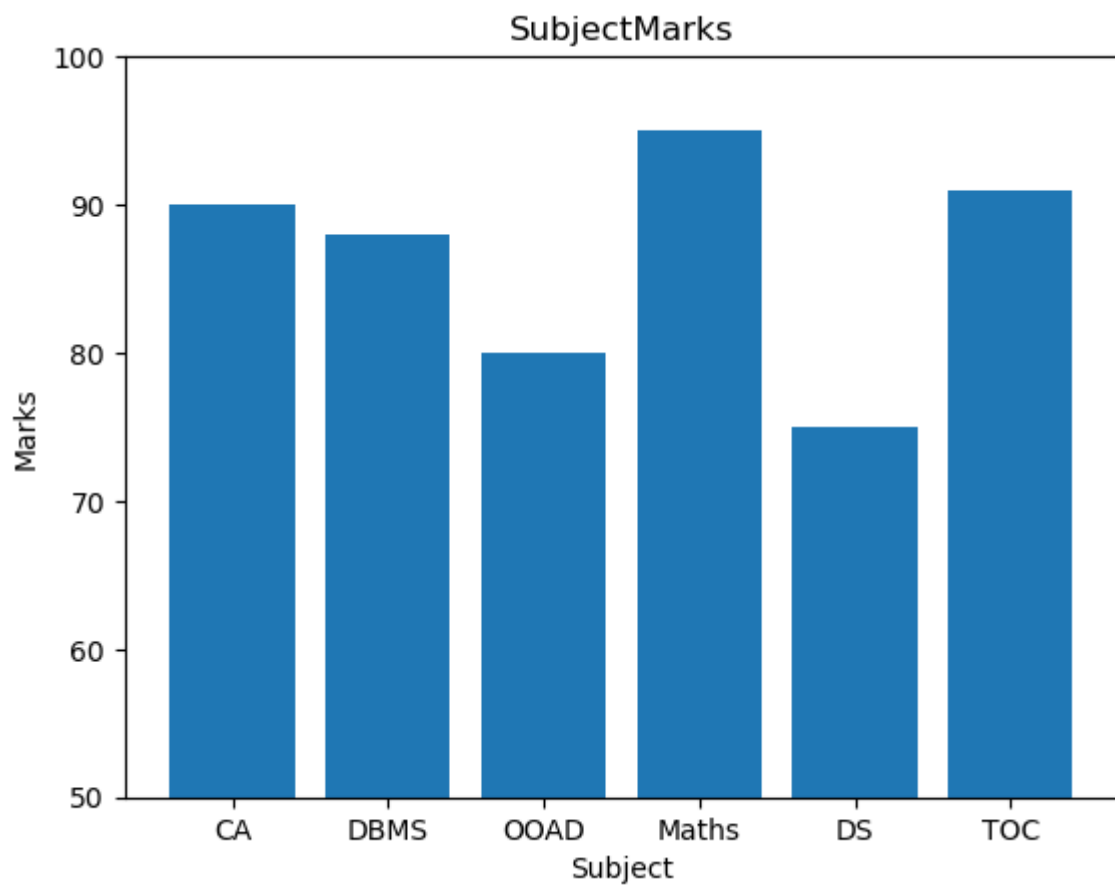
```
In [45]: import seaborn as sns
```

```
In [47]: mark=[90,88,80,95,75,91]  
subj=["CA", "DBMS", "OOAD", "Maths", "DS", "TOC"]  
plt.bar(subj,mark)
```

```
Out[47]: <BarContainer object of 6 artists>
```

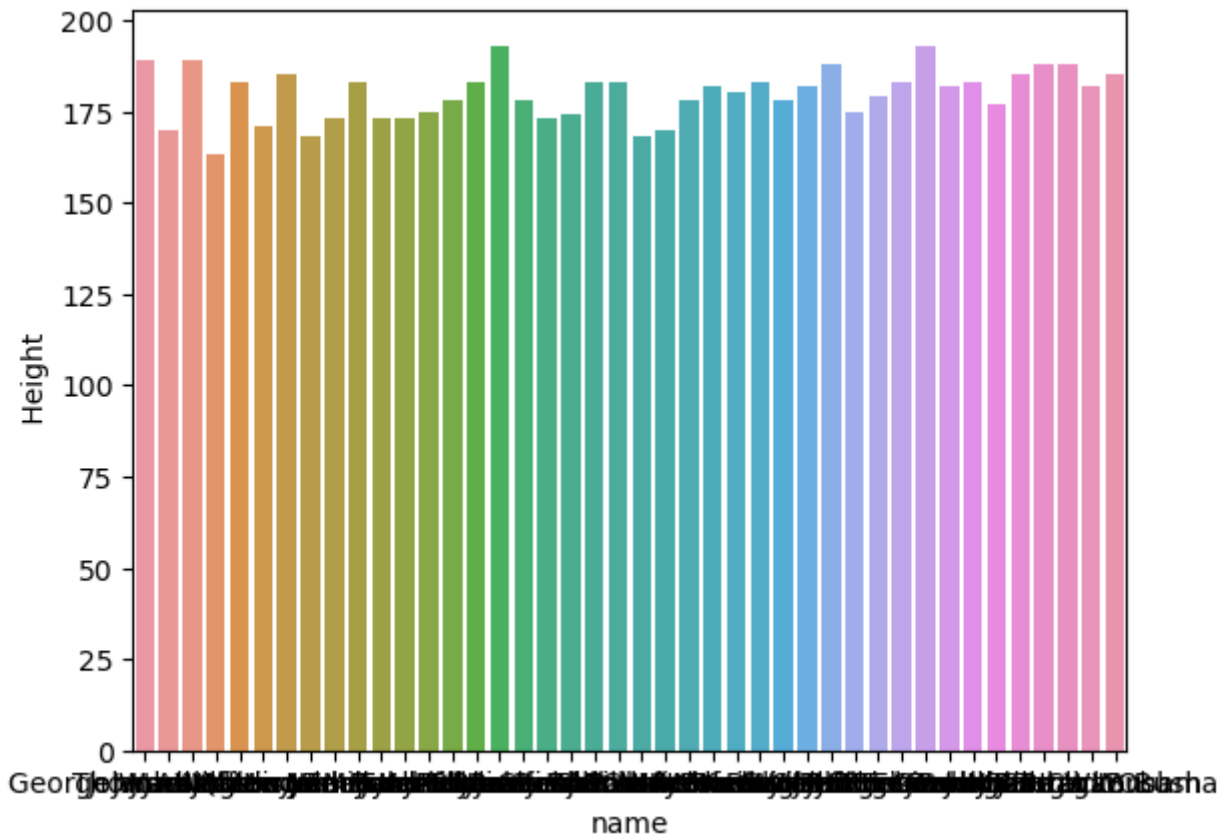


```
In [54]: mark=[90,88,80,95,75,91]
subj=["CA","DBMS","OOAD","Maths","DS","TOC"]
plt.bar(subj,mark)
plt.title("SubjectMarks")
plt.xlabel("Subject")
plt.ylabel("Marks")
plt.ylim(50,100)
plt.show()
```



```
In [56]: sns.barplot(x='name',y=' Height',data=ds)
```

```
Out[56]: <AxesSubplot:xlabel='name', ylabel=' Height'>
```



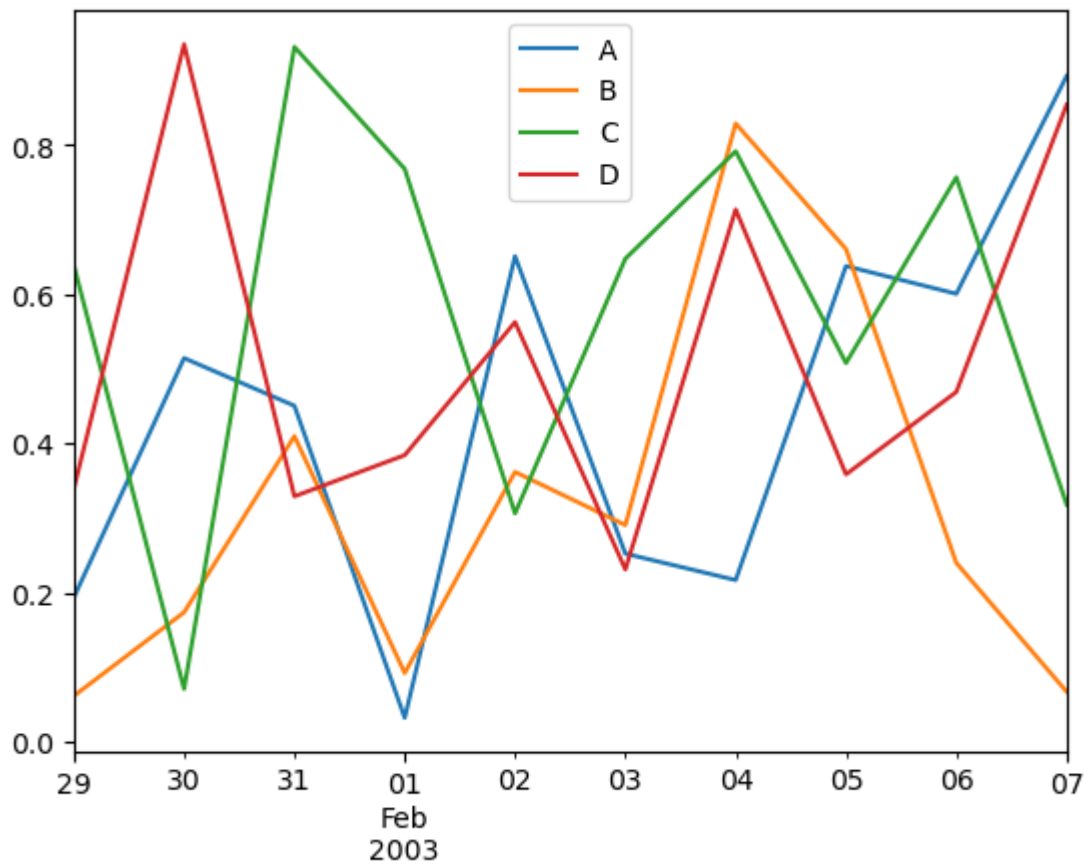
```
In [ ]:
```

```
In [1]: import pandas as pd
import numpy as np
import matplotlib.pyplot as plt
import seaborn as sns
```

```
In [3]: ds=pd.DataFrame(np.random.rand(10,4),index=pd.date_range('29/1/2003',periods=10),col
```

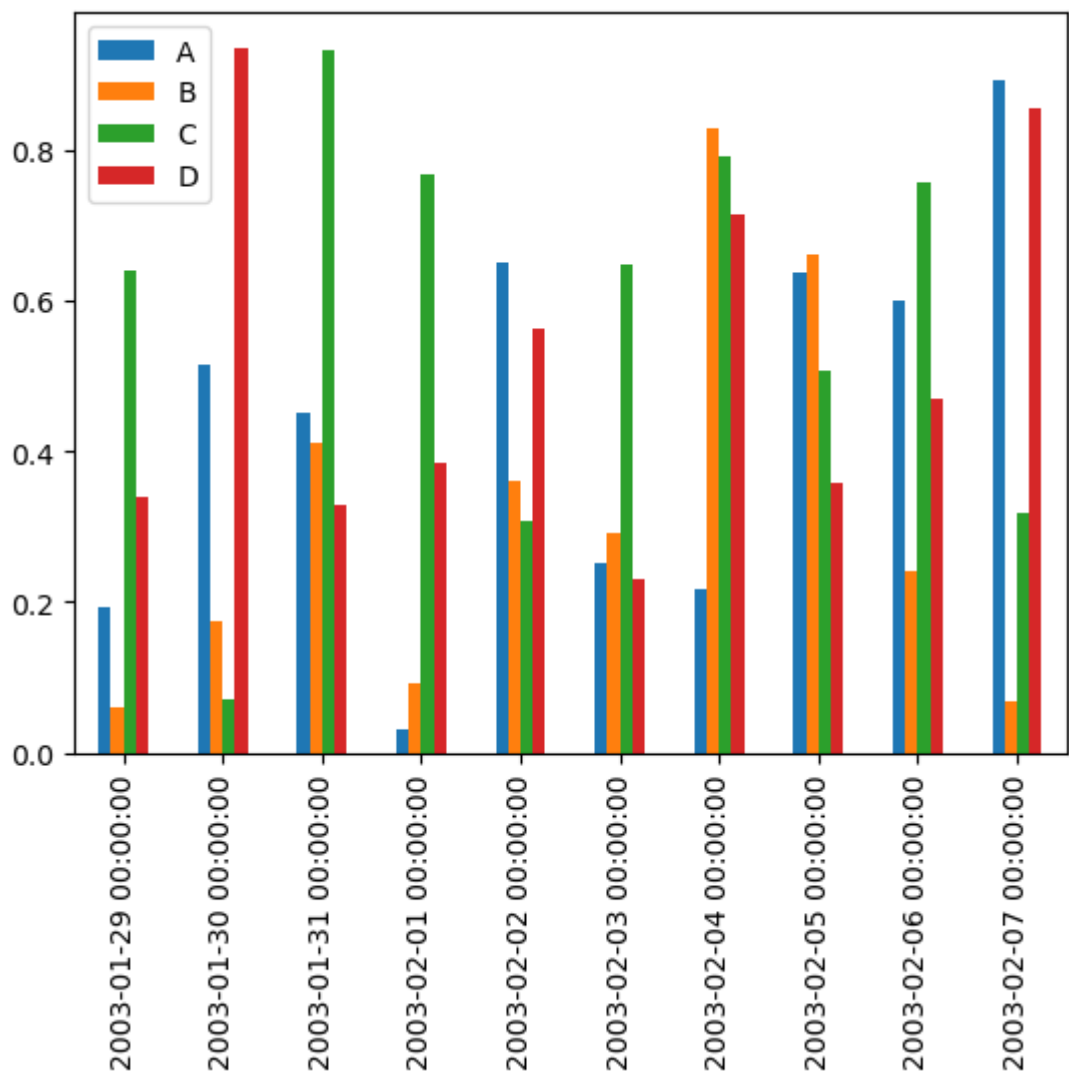
```
In [4]: ds.plot()
```

```
Out[4]: <AxesSubplot:>
```



```
In [7]: ds.plot.bar()
```

```
Out[7]: <AxesSubplot:>
```



```
In [12]: ds=pd.DataFrame(np.random.rand(10,4),columns=['A', 'B', 'C', 'D'])
```

```
In [13]: ds
```

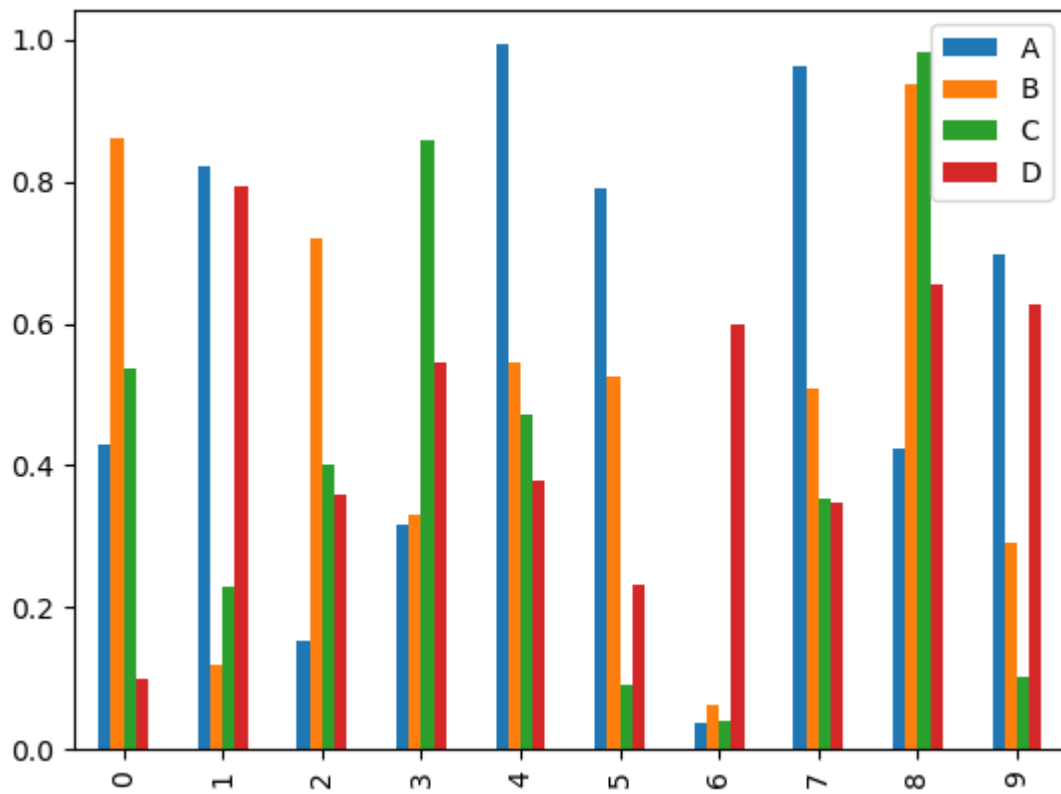
```
Out[13]:
```

	A	B	C	D
0	0.429742	0.861257	0.536976	0.098552
1	0.821091	0.119982	0.228226	0.792858
2	0.152060	0.718719	0.400002	0.360022
3	0.316785	0.331696	0.857912	0.545348
4	0.992103	0.546503	0.470522	0.379976
5	0.789536	0.526414	0.091232	0.231009
6	0.037114	0.061977	0.041683	0.599419
7	0.961145	0.507197	0.354764	0.346618
8	0.423723	0.937593	0.983341	0.654281
9	0.696485	0.291024	0.101333	0.625484



```
In [14]: ds.plot.bar()
```

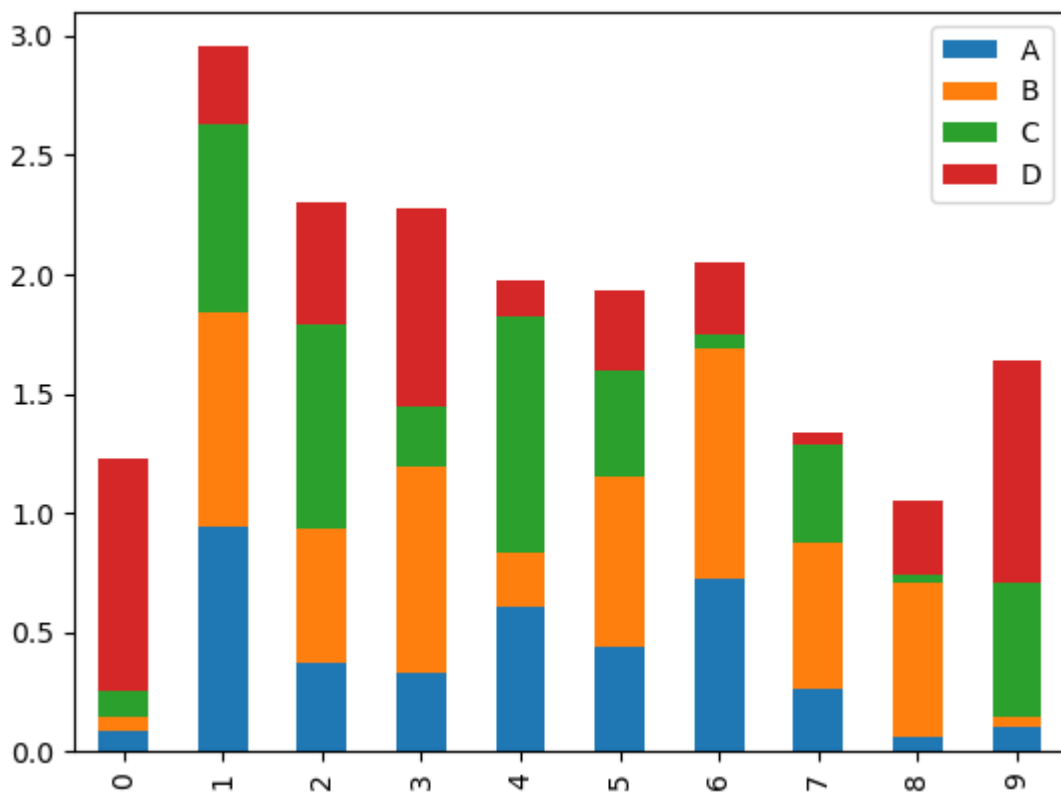
```
Out[14]: <AxesSubplot:>
```



```
In [15]: ds=pd.DataFrame(np.random.rand(10,4),columns=['A','B','C','D'])
```

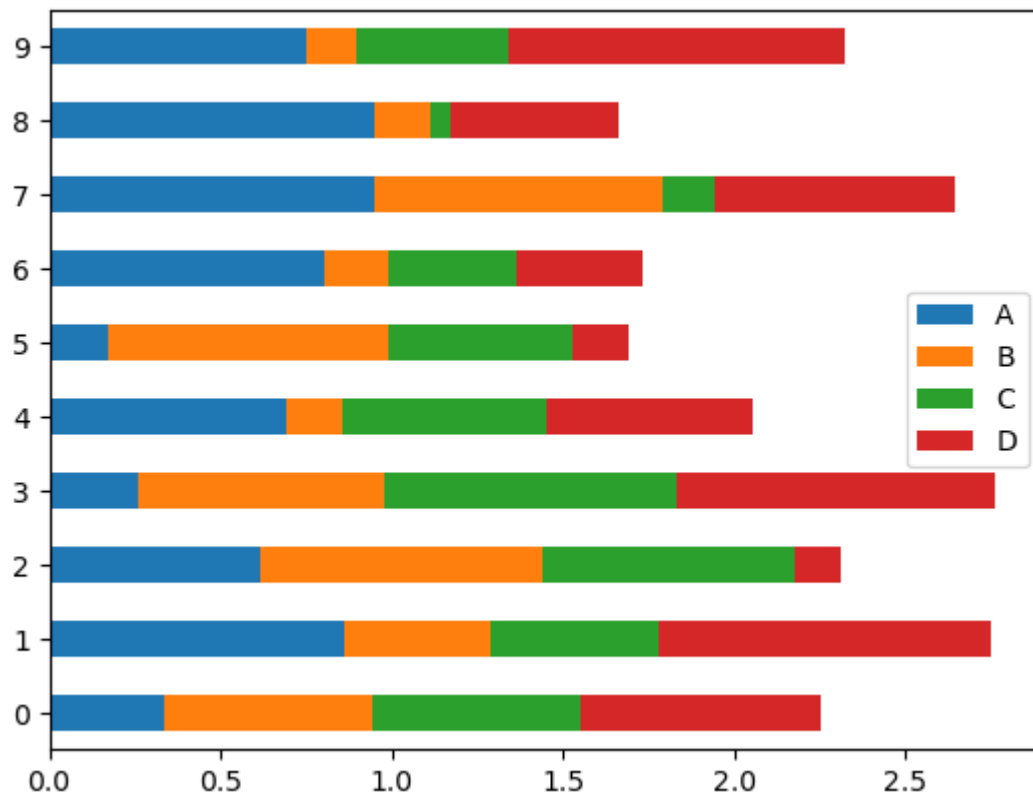
```
In [16]: ds.plot.bar(stacked=True)
```

```
Out[16]: <AxesSubplot:>
```



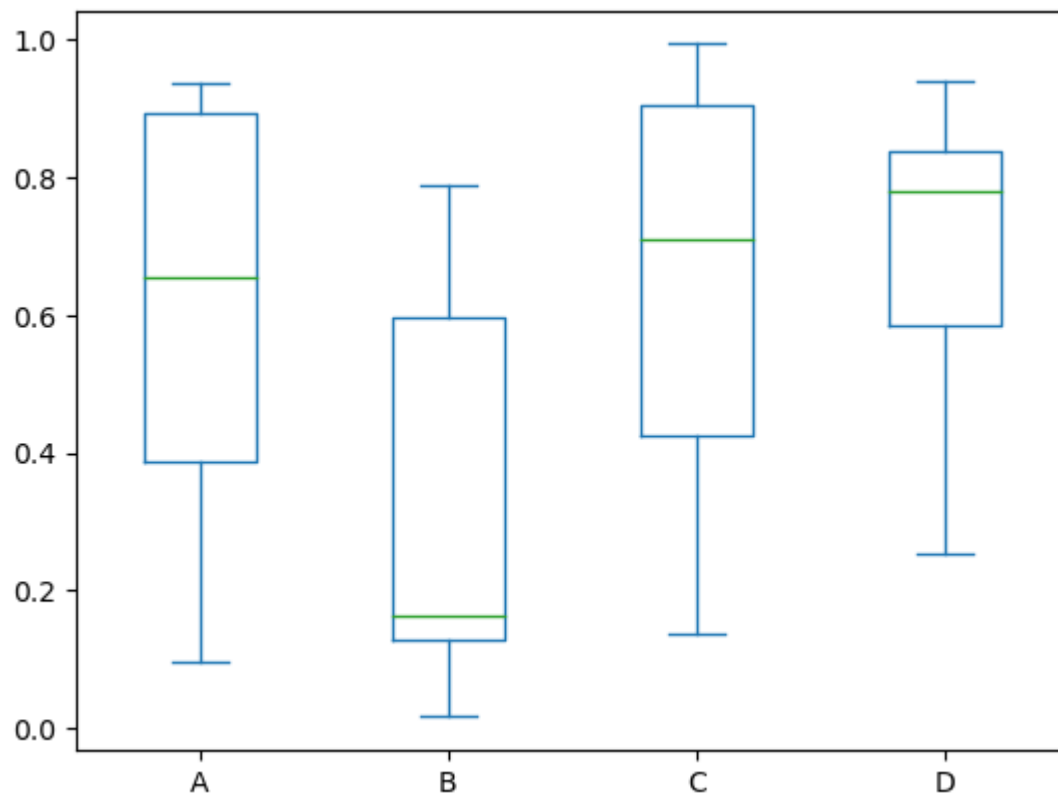
```
In [17]: ds=pd.DataFrame(np.random.rand(10,4),columns=['A','B','C','D'])
ds.plot.barh(stacked=True)
```

Out[17]: <AxesSubplot:>



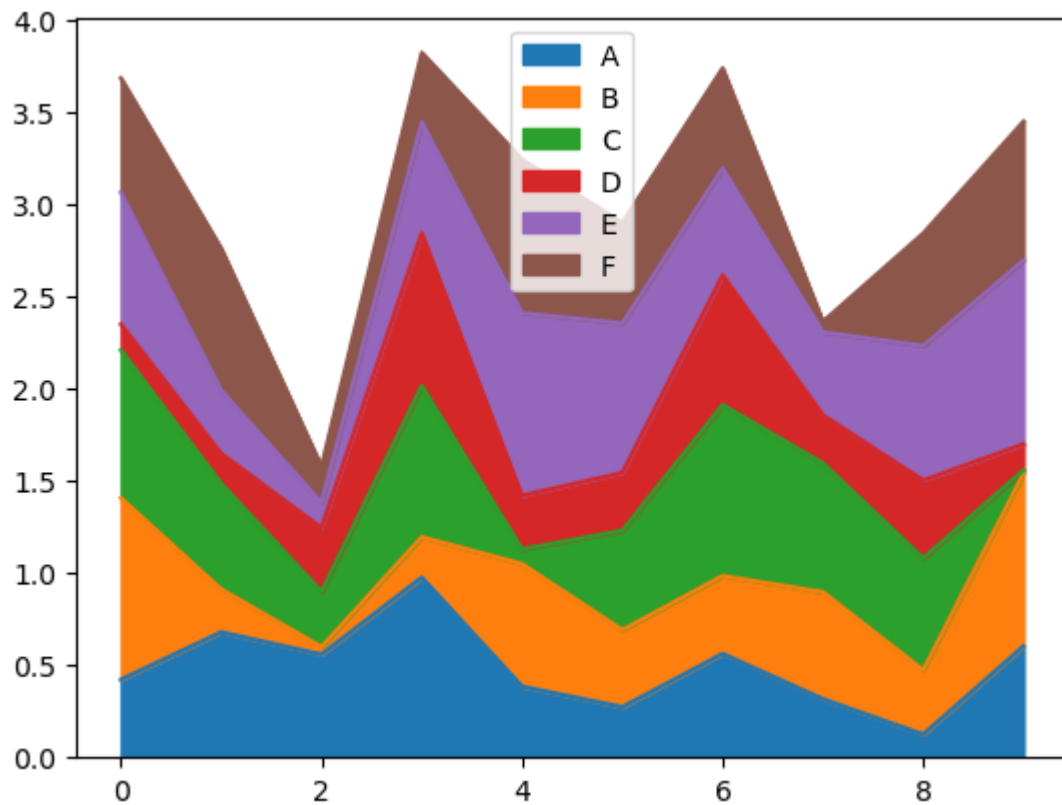
```
In [18]: ds=pd.DataFrame(np.random.rand(10,4),columns=['A','B','C','D'])
ds.plot.box()
```

Out[18]: <AxesSubplot:>



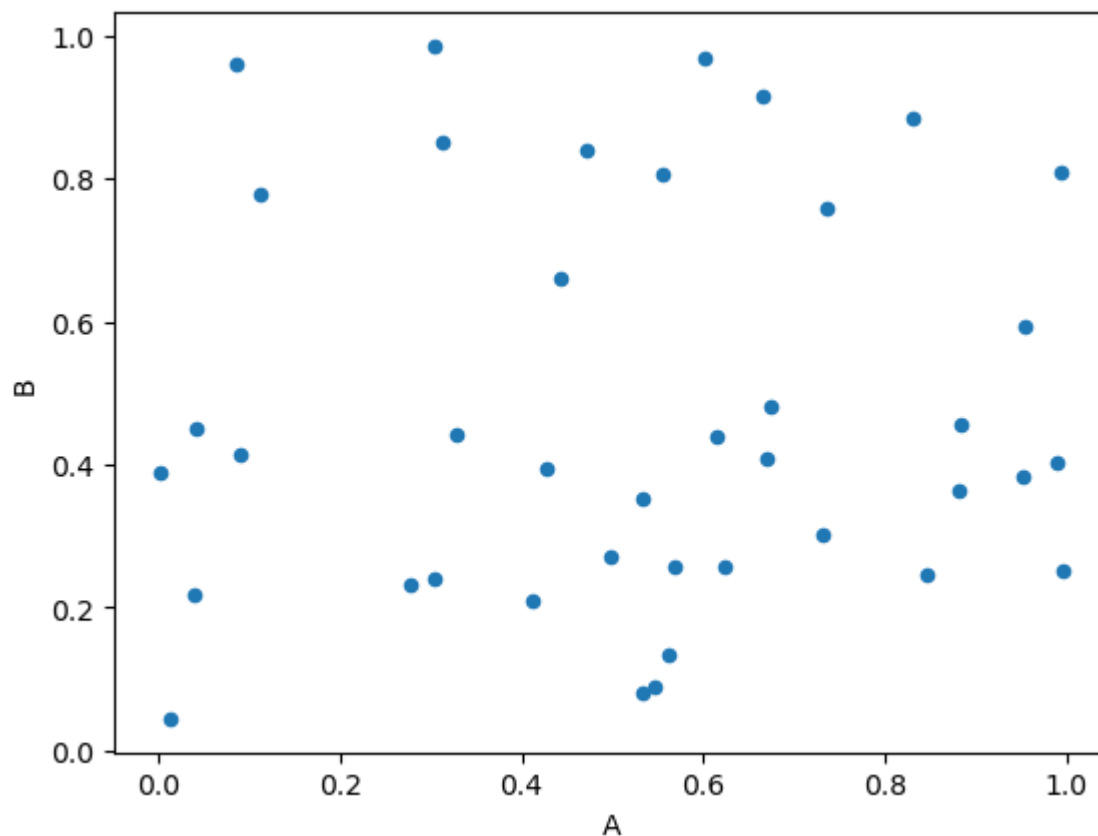
```
In [19]: ds=pd.DataFrame(np.random.rand(10,6),columns=['A','B','C','D','E','F'])
ds.plot.area()
```

Out[19]: <AxesSubplot:>



```
In [23]: ds=pd.DataFrame(np.random.rand(40,4),columns=['A','B','C','D'])
ds.plot.scatter(x='A',y='B')
```

Out[23]: <AxesSubplot:xlabel='A', ylabel='B'>



```
In [24]: dt=pd.read_csv('D:\president_heights.csv')
```

In [25]: `dt`

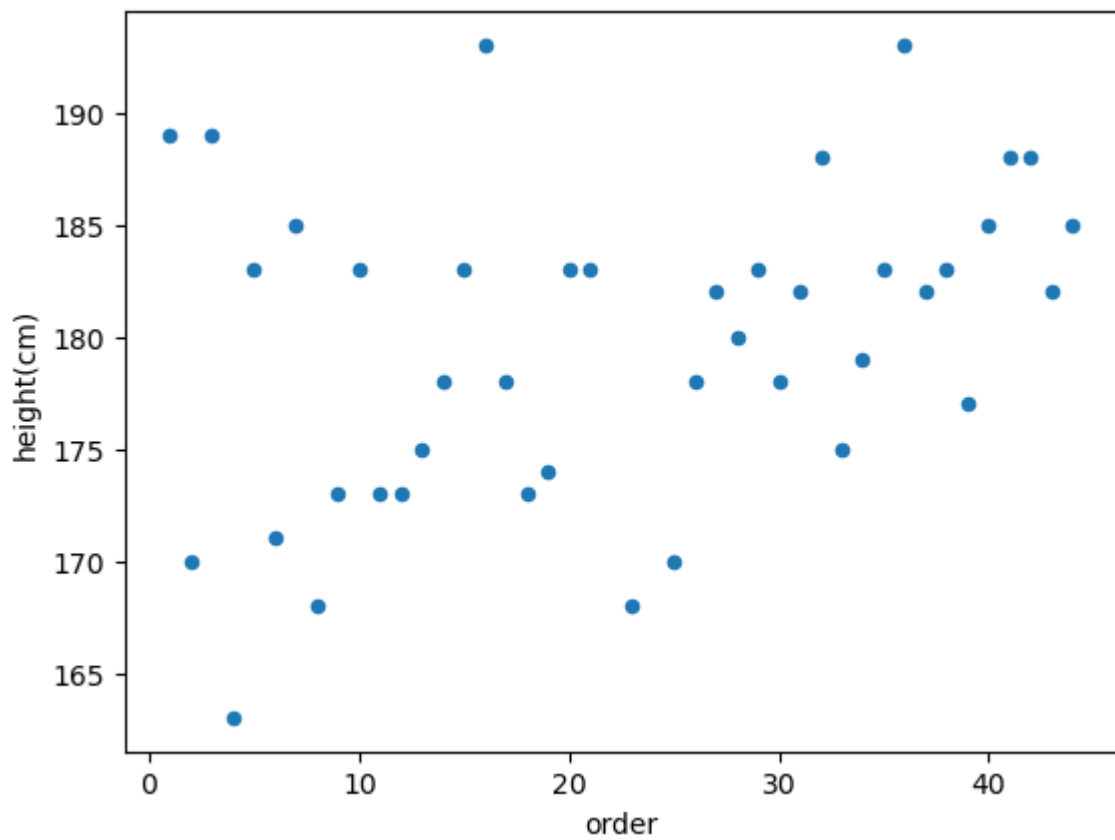
Out[25]:

	order	name	height(cm)
0	1	George Washington	189
1	2	John Adams	170
2	3	Thomas Jefferson	189
3	4	James Madison	163
4	5	James Monroe	183
5	6	John Quincy Adams	171
6	7	Andrew Jackson	185
7	8	Martin Van Buren	168
8	9	William Henry Harrison	173
9	10	John Tyler	183
10	11	James K. Polk	173
11	12	Zachary Taylor	173
12	13	Millard Fillmore	175
13	14	Franklin Pierce	178
14	15	James Buchanan	183
15	16	Abraham Lincoln	193
16	17	Andrew Johnson	178
17	18	Ulysses S. Grant	173
18	19	Rutherford B. Hayes	174
19	20	James A. Garfield	183
20	21	Chester A. Arthur	183
21	23	Benjamin Harrison	168
22	25	William McKinley	170
23	26	Theodore Roosevelt	178
24	27	William Howard Taft	182
25	28	Woodrow Wilson	180
26	29	Warren G. Harding	183
27	30	Calvin Coolidge	178
28	31	Herbert Hoover	182
29	32	Franklin D. Roosevelt	188
30	33	Harry S. Truman	175
31	34	Dwight D. Eisenhower	179
32	35	John F. Kennedy	183
33	36	Lyndon B. Johnson	193
34	37	Richard Nixon	182
35	38	Gerald Ford	183
36	39	Jimmy Carter	177
37	40	Ronald Reagan	185
38	41	George H. W. Bush	188
39	42	Bill Clinton	188
40	43	George W. Bush	182

	order	name	height(cm)
41	44	Barack Obama	185

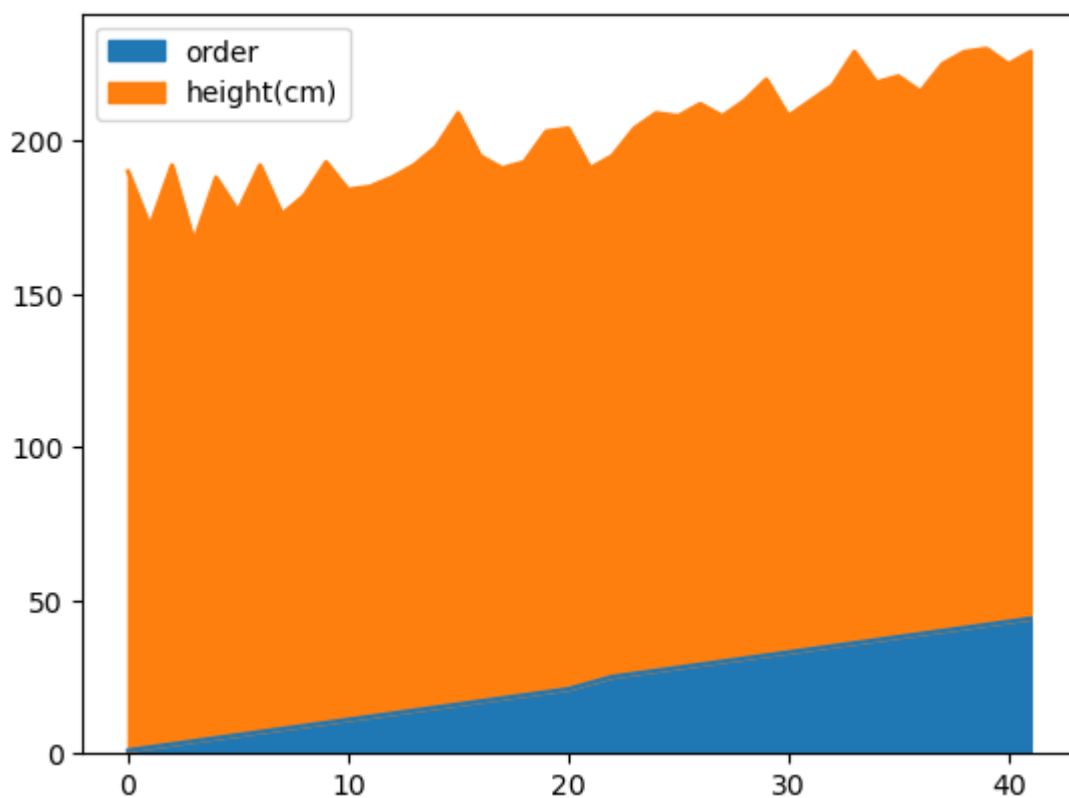
In [26]: `dt.plot.scatter(x='order',y='height(cm)')`

Out[26]: `<AxesSubplot:xlabel='order', ylabel='height(cm)'\>`



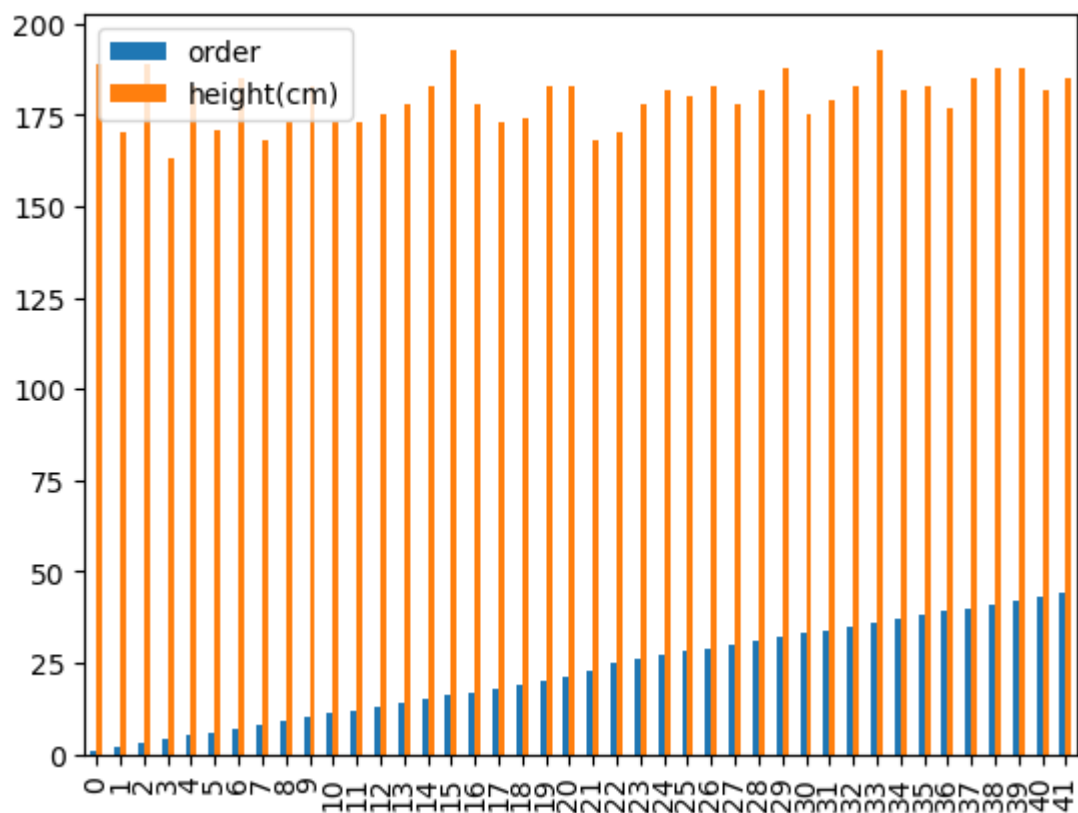
In [27]: `dt.plot.area()`

Out[27]: `<AxesSubplot:\>`



```
In [28]: dt.plot.bar()
```

```
Out[28]: <AxesSubplot:>
```



```
In [3]: import pandas as pd
dt=pd.read_csv('D:\president_heights.csv')
```

```
In [4]: data=[1,2,3,4,5]
```

```
In [5]: data
```

```
Out[5]: [1, 2, 3, 4, 5]
```

```
In [6]: df=pd.DataFrame(data)
```

```
In [7]: df
```

```
Out[7]:
```

	0
0	1
1	2
2	3
3	4
4	5



```
In [11]: df[0]
```

```
Out[11]: 0    1
          1    2
          2    3
          3    4
          4    5
          Name: 0, dtype: int64
```

```
In [13]: df[0][2]
```

```
Out[13]: 3
```

```
In [14]: df[0][1]
```

```
Out[14]: 2
```

```
In [15]: data1=['Anu',18],['Bhav',19],['Vidhya',20],['Laali',17],['Sai',11]
```

```
In [16]: data1
```

```
Out[16]: ([ 'Anu', 18], [ 'Bhav', 19], [ 'Vidhya', 20], [ 'Laali', 17], [ 'Sai', 11])
```

```
In [17]: datf=pd.DataFrame(data1)
```

```
In [18]: datf
```

```
Out[18]:
```

	0	1
0	Anu	18
1	Bhav	19
2	Vidhya	20
3	Laali	17
4	Sai	11

```
In [19]: datf.iloc[2]
```

```
Out[19]: 0    Vidhya
          1         20
          Name: 2, dtype: object
```

```
In [21]: datf[1][2]
```

```
Out[21]: 20
```

```
In [22]: datf[0][1][2]
```

```
Out[22]: 'a'
```

```
In [27]: datf[0:][2:3]
```

```
Out[27]:
```

	0	1
2	Vidhya	20

```
In [28]: data1=['Anu',18],['Bhav',19],['Vidhya',20],['Laali',17],['Sai',11]  
dtf=pd.DataFrame(data1,columns=['Name','Age'])
```

```
In [29]: dtf
```

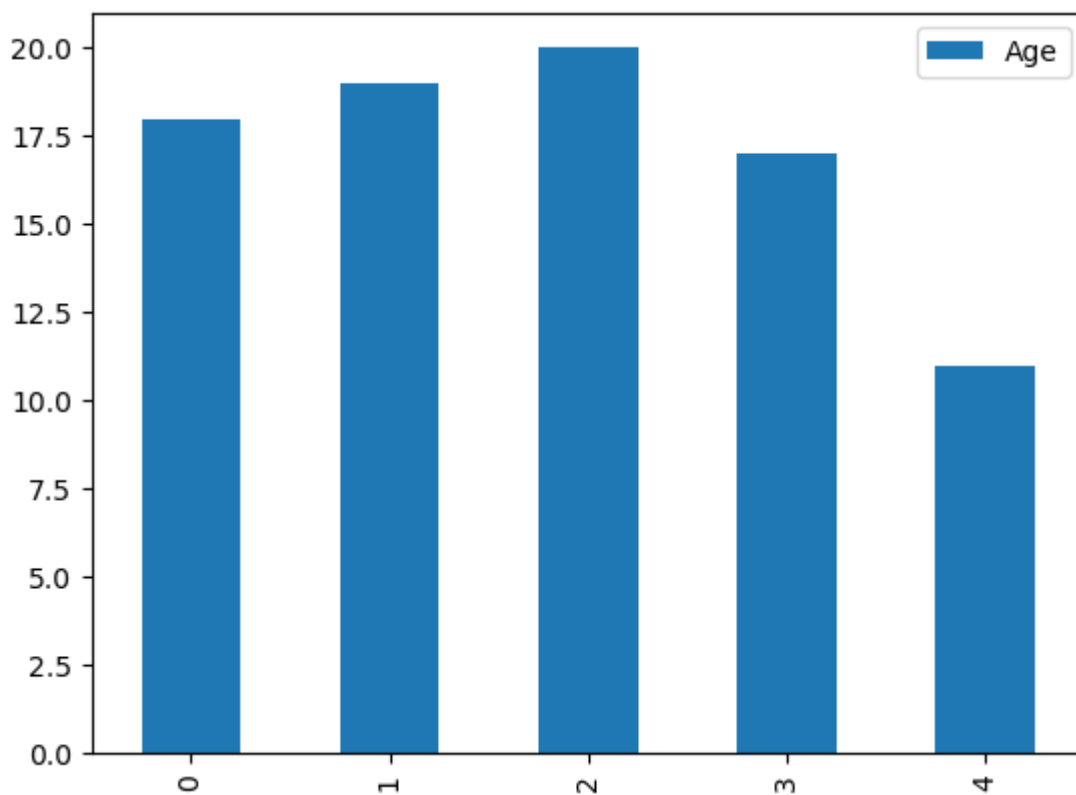
```
Out[29]:
```

	Name	Age
0	Anu	18
1	Bhav	19
2	Vidhya	20
3	Laali	17
4	Sai	11

```
In [30]: import numpy as np  
import matplotlib.pyplot as plt  
import seaborn as sns
```

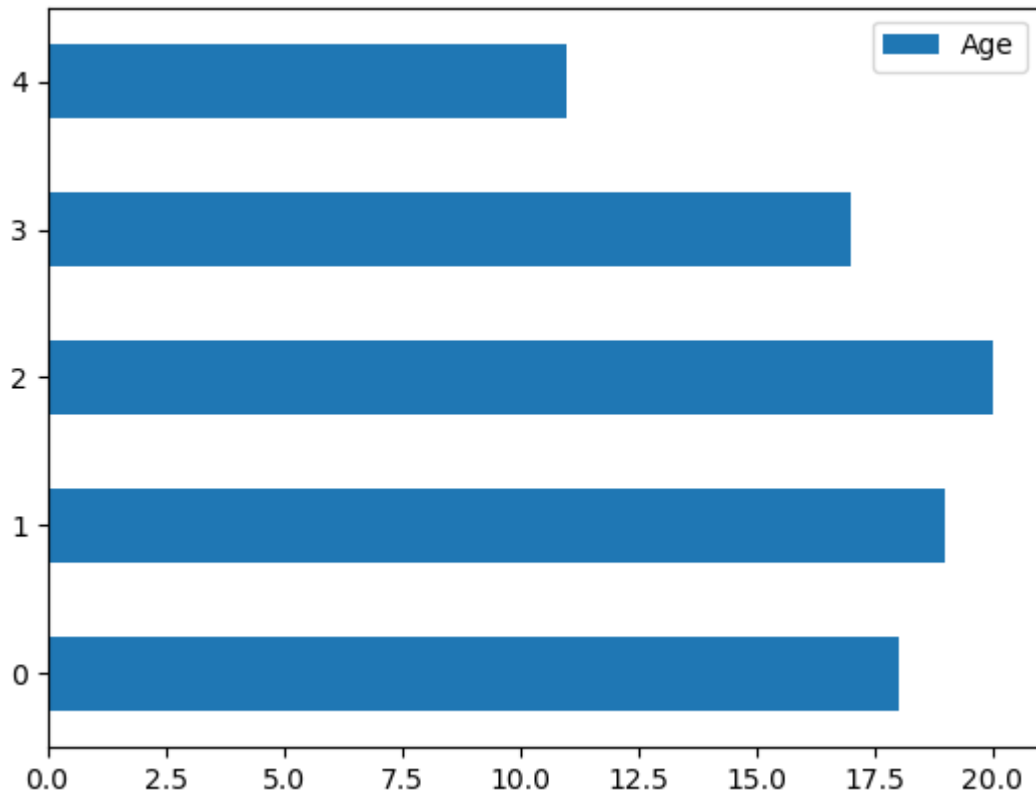
```
In [31]: dtf.plot.bar()
```

```
Out[31]: <AxesSubplot:>
```



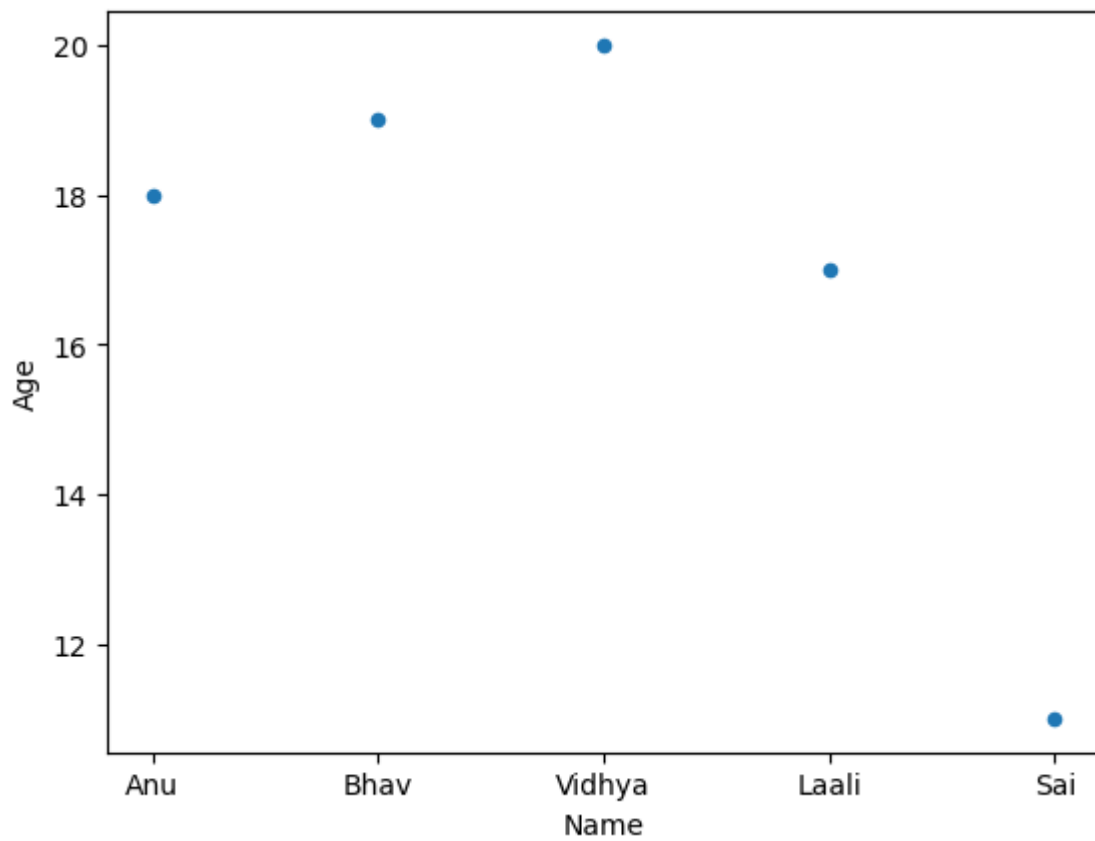
```
In [32]: dtf.plot.barh()
```

```
Out[32]: <AxesSubplot:>
```



```
In [33]: dtf.plot.scatter(x='Name',y='Age')
```

```
Out[33]: <AxesSubplot:xlabel='Name', ylabel='Age'>
```



```
In [34]: data2=[ 'Anu',18,'ECE' ],[ 'Bhav',19,'CSE' ],[ 'Vidhya',20,'EEE' ],[ 'Laali',17,'ME' ],[ 'Sai',11,'IT' ]
```

```
In [35]: data2
```

```
Out[35]: ([ 'Anu', 18, 'ECE' ],  
          [ 'Bhav', 19, 'CSE' ],  
          [ 'Vidhya', 20, 'EEE' ],  
          [ 'Laali', 17, 'ME' ],  
          [ 'Sai', 11, 'IT' ])
```

```
In [41]: dfx=pd.DataFrame(data2,columns=[ 'Name', 'Age', 'Dept' ])
```

```
In [42]: dfx
```

```
Out[42]:
```

	Name	Age	Dept
0	Anu	18	ECE
1	Bhav	19	CSE
2	Vidhya	20	EEE
3	Laali	17	ME
4	Sai	11	IT

```
In [43]: data3={ 'Name': [ 'Niki', 'Bhav', 'Vidhya', 'Laali', 'Sai' ], 'Age': [19,20,21,22,11], 'Department': [ 'EEE', 'CSE', 'IT', 'AIDS', 'MBBS' ] }
```

```
In [44]: data3
```

```
Out[44]: { 'Name': [ 'Niki', 'Bhav', 'Vidhya', 'Laali', 'Sai' ],  
          'Age': [19, 20, 21, 22, 11],  
          'Department': [ 'EEE', 'CSE', 'IT', 'AIDS', 'MBBS' ] }
```

```
In [45]: df1=pd.DataFrame(data3)
```

```
In [46]: df1
```

```
Out[46]:
```

	Name	Age	Department
0	Niki	19	EEE
1	Bhav	20	CSE
2	Vidhya	21	IT
3	Laali	22	AIDS
4	Sai	11	MBBS

```
In [50]: df1=pd.DataFrame(data3,columns=[ 'Name', 'Age', 'Department' ],index=[ 'first', 'second', 'third', 'fourth', 'fifth' ])
```

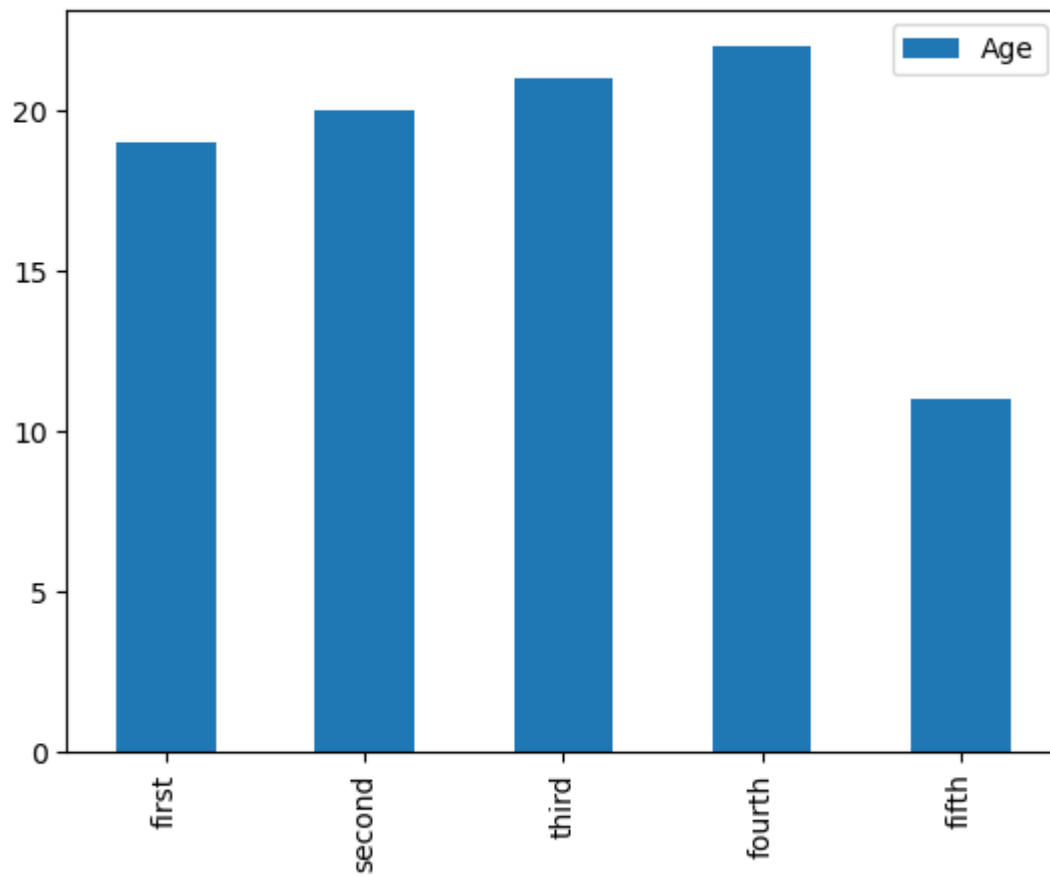
```
In [51]: df1
```

```
Out[51]:
```

	Name	Age	Department
<b>first</b>	Niki	19	EEE
<b>second</b>	Bhav	20	CSE
<b>third</b>	Vidhya	21	IT
<b>fourth</b>	Laali	22	AIDS
<b>fifth</b>	Sai	11	MBBS

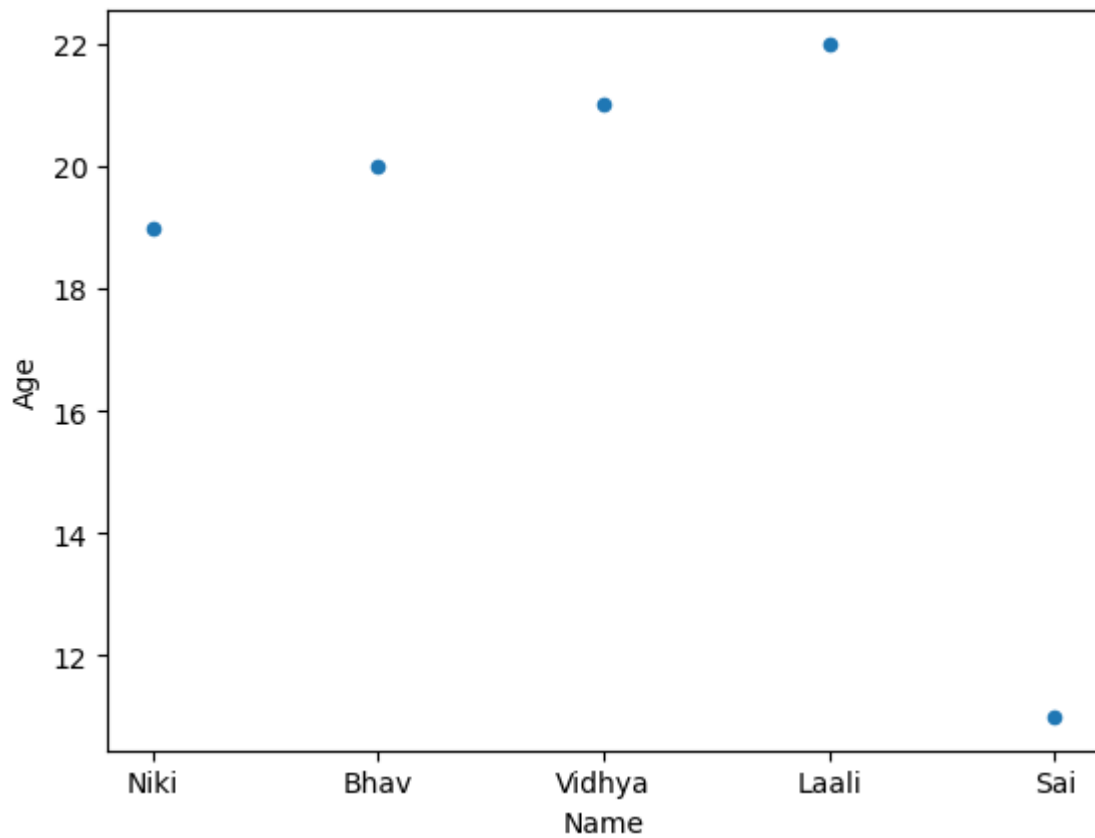
```
In [52]: df1.plot.bar()
```

```
Out[52]: <AxesSubplot:>
```



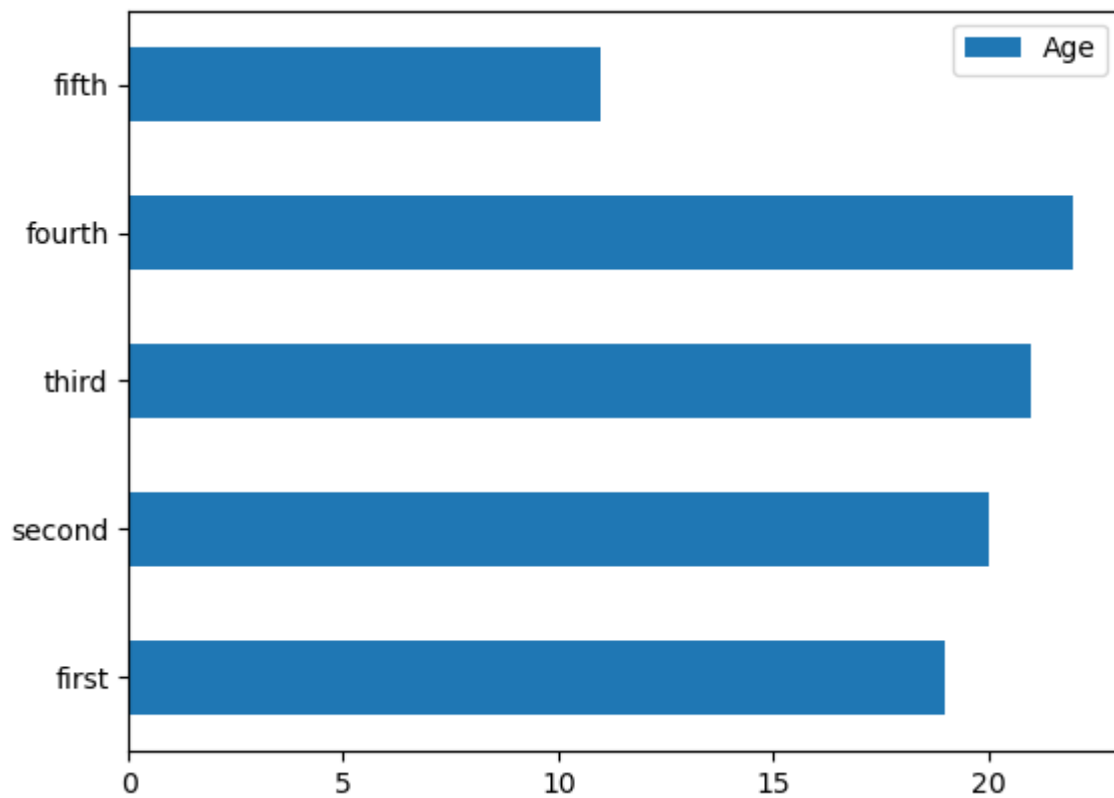
```
In [54]: df1.plot.scatter(x='Name',y='Age')
```

```
Out[54]: <AxesSubplot:xlabel='Name', ylabel='Age'>
```



```
In [56]: df1.plot.barh()
```

```
Out[56]: <AxesSubplot:>
```



In [ ]:

```
In [1]: #Let us assume that dataset consists of 5cols namely RollNo,Name,Dept,Mark and Locat
#Write the code for following functions
#1.Display 1st and last 5rows
#2.Display information of RollNo col
#3.change the colnameRollNo as RegisterNo
#4.delete col("location")
#5.display the mark>80 and <95
#6.display marks in ascending order
#7.insert new cols as GPA
#8.Find the sum of null values
#9.Find the sum of marks
#10.Create a subset for 1st 3cols
#11.Visualize student marks using linechart
#12.Display the name and mark using bar chart
#13.Apply stacked bar chart for any column
#14.Locate the legend in top left location
#15.Draw the scatterplot for any 2cols
#16.Display the x and y axis lables
#17.Display area chart for any 2cols
#18.Find the max mark
#19.Find the min mark
#20.Find mean value for the column Mark
```

```
In [2]: import pandas as pd
import numpy as np
import matplotlib.pyplot as plt
import seaborn as sns
```

```
In [3]: ds=pd.DataFrame({'RollNo':[1,2,3,4,5,6,7,8,9,10], 'Name':['Anu', 'Bhav', 'Charu', 'Ram',
◀ [REDACTED] ▶
```

```
In [4]: ds
```

```
Out[4]:
```

	RollNo	Name	Dept	Mark	Location
0	1	Anu	CSE	90	AP
1	2	Bhav	EEE	95	TN
2	3	Charu	IT	91	Kerala
3	4	Ram	AIDS	87	Mumbai
4	5	Yesu	ECE	85	AP
5	6	Honey	Civil	85	TN
6	7	Laali	Mech	80	AP
7	8	Vishnu	CSE	75	TN
8	9	Jaanu	CSBS	79	TN
9	10	Mouli	IT	100	AP



```
In [5]: ds.head()
```

```
Out[5]:
```

	RollNo	Name	Dept	Mark	Location
0	1	Anu	CSE	90	AP
1	2	Bhav	EEE	95	TN
2	3	Charu	IT	91	Kerala
3	4	Ram	AIDS	87	Mumbai
4	5	Yeshu	ECE	85	AP

```
In [6]: ds.tail()
```

```
Out[6]:
```

	RollNo	Name	Dept	Mark	Location
5	6	Honey	Civil	85	TN
6	7	Laali	Mech	80	AP
7	8	Vishnu	CSE	75	TN
8	9	Jaanu	CSBS	79	TN
9	10	Mouli	IT	100	AP

```
In [7]: ds.head(2)
```

```
Out[7]:
```

	RollNo	Name	Dept	Mark	Location
0	1	Anu	CSE	90	AP
1	2	Bhav	EEE	95	TN

```
In [8]: ds.tail(2)
```

```
Out[8]:
```

	RollNo	Name	Dept	Mark	Location
8	9	Jaanu	CSBS	79	TN
9	10	Mouli	IT	100	AP

```
In [9]: ds.columns
```

```
Out[9]: Index(['RollNo', 'Name', 'Dept', 'Mark', 'Location'], dtype='object')
```

```
In [10]: ds.rename(columns={'RollNo':'RegNum'})
```

```
Out[10]:
```

	RegNum	Name	Dept	Mark	Location
0	1	Anu	CSE	90	AP
1	2	Bhav	EEE	95	TN
2	3	Charu	IT	91	Kerala
3	4	Ram	AIDS	87	Mumbai
4	5	Yesu	ECE	85	AP
5	6	Honey	Civil	85	TN
6	7	Laali	Mech	80	AP
7	8	Vishnu	CSE	75	TN
8	9	Jaanu	CSBS	79	TN
9	10	Mouli	IT	100	AP

```
In [11]: ds.drop(columns=['Location'])
```

```
Out[11]:
```

	RollNo	Name	Dept	Mark
0	1	Anu	CSE	90
1	2	Bhav	EEE	95
2	3	Charu	IT	91
3	4	Ram	AIDS	87
4	5	Yesu	ECE	85
5	6	Honey	Civil	85
6	7	Laali	Mech	80
7	8	Vishnu	CSE	75
8	9	Jaanu	CSBS	79
9	10	Mouli	IT	100

```
In [12]: ds.drop(columns=['Location'],inplace=True)
```

```
In [13]: ds[((ds['Mark']>=90)&(ds['Mark']<=100))]
```

```
Out[13]:
```

	RollNo	Name	Dept	Mark
0	1	Anu	CSE	90
1	2	Bhav	EEE	95
2	3	Charu	IT	91
9	10	Mouli	IT	100

```
In [14]: sorted_ds=ds.sort_values(by='Mark',ascending =False)
```

```
In [15]: sorted_ds
```

```
Out[15]:
```

	RollNo	Name	Dept	Mark
9	10	Mouli	IT	100
1	2	Bhav	EEE	95
2	3	Charu	IT	91
0	1	Anu	CSE	90
3	4	Ram	AIDS	87
4	5	Yesu	ECE	85
5	6	Honey	Civil	85
6	7	Laali	Mech	80
8	9	Jaanu	CSBS	79
7	8	Vishnu	CSE	75

```
In [16]: ds.sort_values(by='Mark')
```

```
Out[16]:
```

	RollNo	Name	Dept	Mark
7	8	Vishnu	CSE	75
8	9	Jaanu	CSBS	79
6	7	Laali	Mech	80
4	5	Yesu	ECE	85
5	6	Honey	Civil	85
3	4	Ram	AIDS	87
0	1	Anu	CSE	90
2	3	Charu	IT	91
1	2	Bhav	EEE	95
9	10	Mouli	IT	100

```
In [17]: ds.insert(4,"GPA","10")
```

```
In [18]: ds
```

```
Out[18]:
```

	RollNo	Name	Dept	Mark	GPA
0	1	Anu	CSE	90	10
1	2	Bhav	EEE	95	10
2	3	Charu	IT	91	10
3	4	Ram	AIDS	87	10
4	5	Yesu	ECE	85	10
5	6	Honey	Civil	85	10
6	7	Laali	Mech	80	10
7	8	Vishnu	CSE	75	10
8	9	Jaanu	CSBS	79	10
9	10	Mouli	IT	100	10

```
In [19]: ds1=ds.assign(GPA=[9.8,10,9,7.8,8,7.9,6.7,9.0,8.5,9.2])
```

```
In [20]: ds1
```

Out[20]:

	RollNo	Name	Dept	Mark	GPA
0	1	Anu	CSE	90	9.8
1	2	Bhav	EEE	95	10.0
2	3	Charu	IT	91	9.0
3	4	Ram	AIDS	87	7.8
4	5	Yesu	ECE	85	8.0
5	6	Honey	Civil	85	7.9
6	7	Laali	Mech	80	6.7
7	8	Vishnu	CSE	75	9.0
8	9	Jaanu	CSBS	79	8.5
9	10	Mouli	IT	100	9.2

```
In [21]: su=ds['Mark'].sum()
```

```
In [22]: su
```

Out[22]: 867

```
In [23]: su=ds1['GPA'].sum()
```

```
In [24]: su
```

Out[24]: 85.9

```
In [25]: subset=ds1[['RollNo','Name','Dept']]
```

```
In [26]: subset
```

Out[26]:

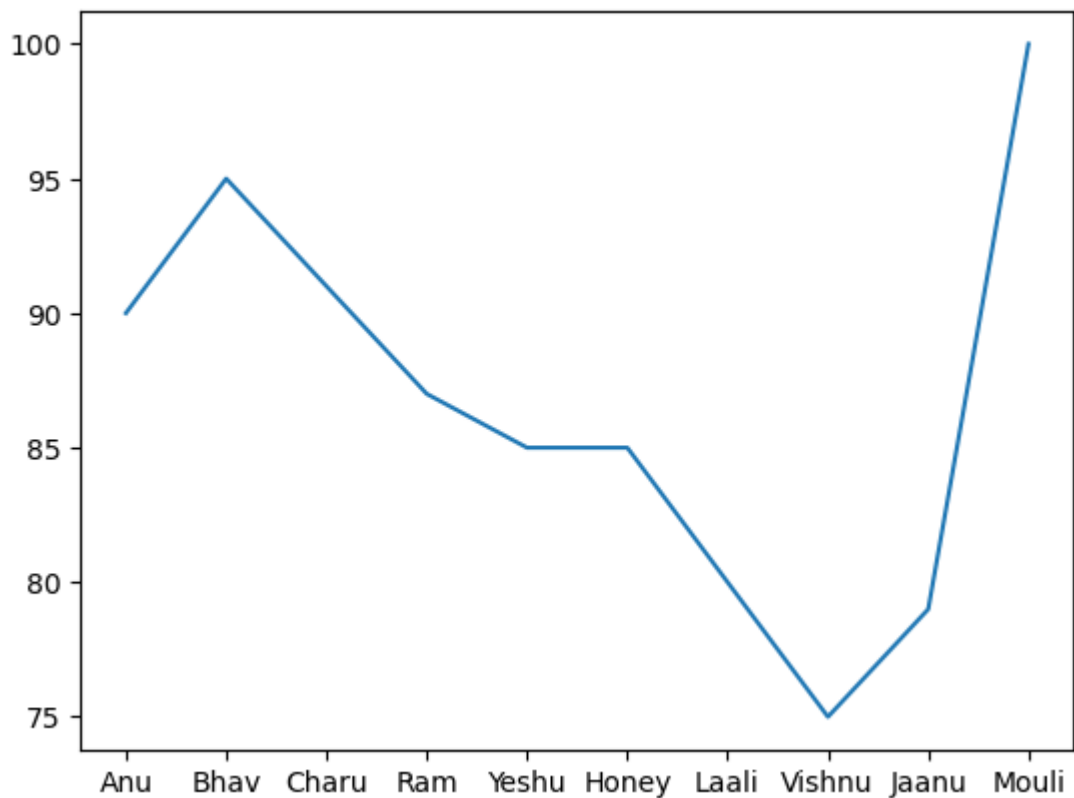
	RollNo	Name	Dept
0	1	Anu	CSE
1	2	Bhav	EEE
2	3	Charu	IT
3	4	Ram	AIDS
4	5	Yesu	ECE
5	6	Honey	Civil
6	7	Laali	Mech
7	8	Vishnu	CSE
8	9	Jaanu	CSBS
9	10	Mouli	IT

```
In [27]: x=ds['Mark']
```

```
In [28]: y=ds['Name']
```

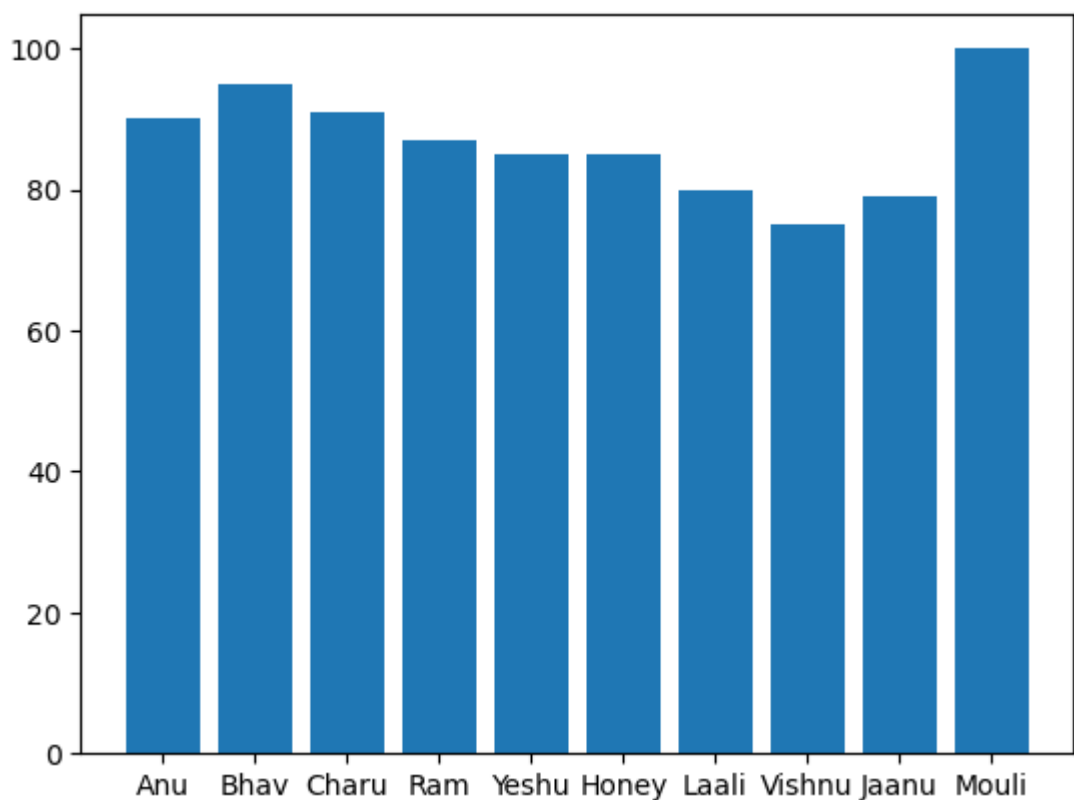
```
In [29]: plt.plot(y,x)
```

```
Out[29]: [ <matplotlib.lines.Line2D at 0x26f17817df0>]
```



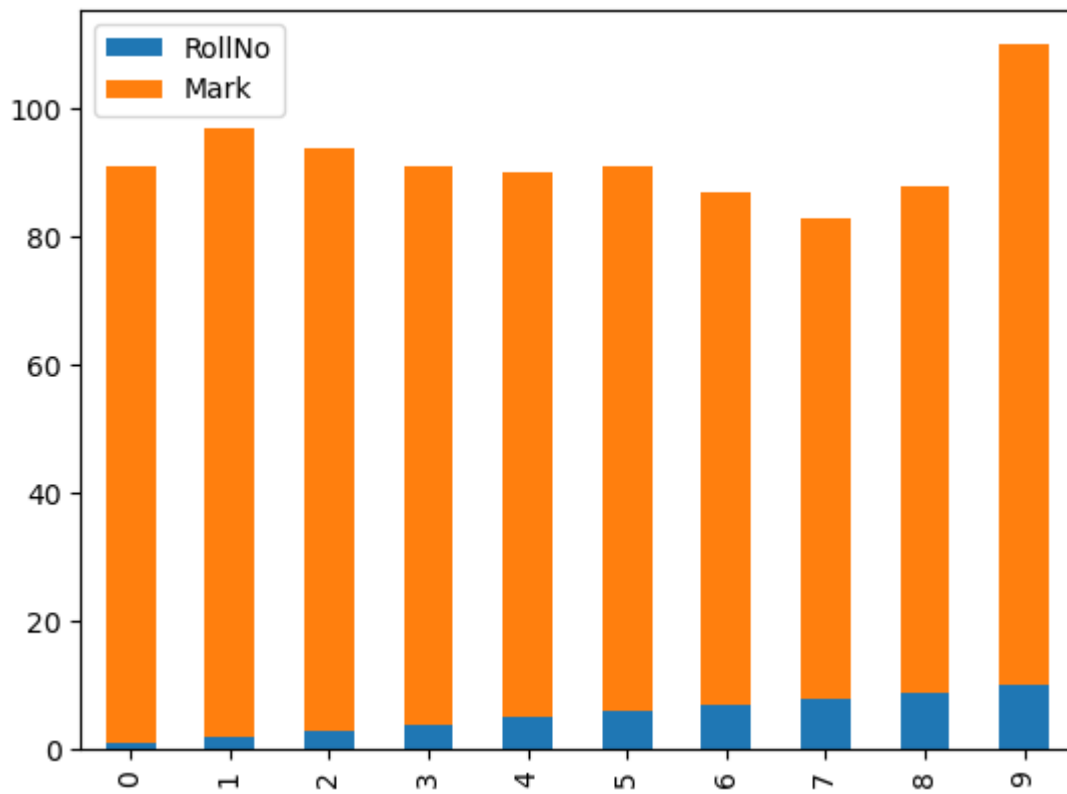
```
In [30]: plt.bar(y,x)
```

```
Out[30]: <BarContainer object of 10 artists>
```



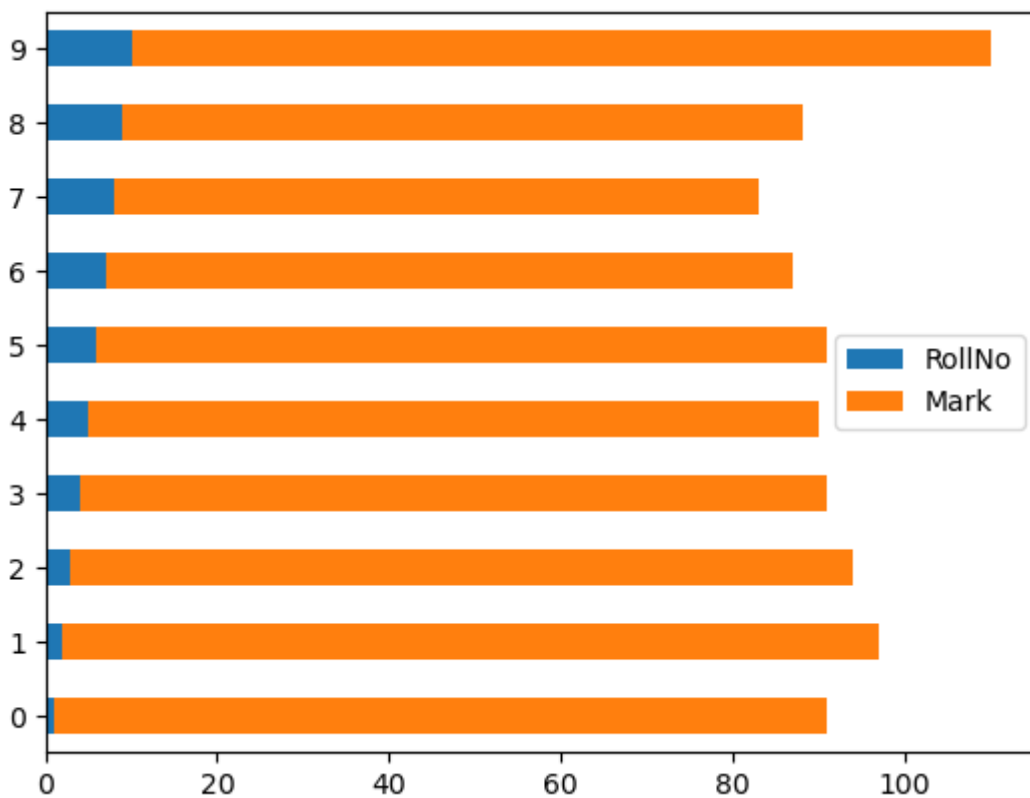
```
In [31]: ds.plot.bar(stacked=True)
```

```
Out[31]: <AxesSubplot:>
```

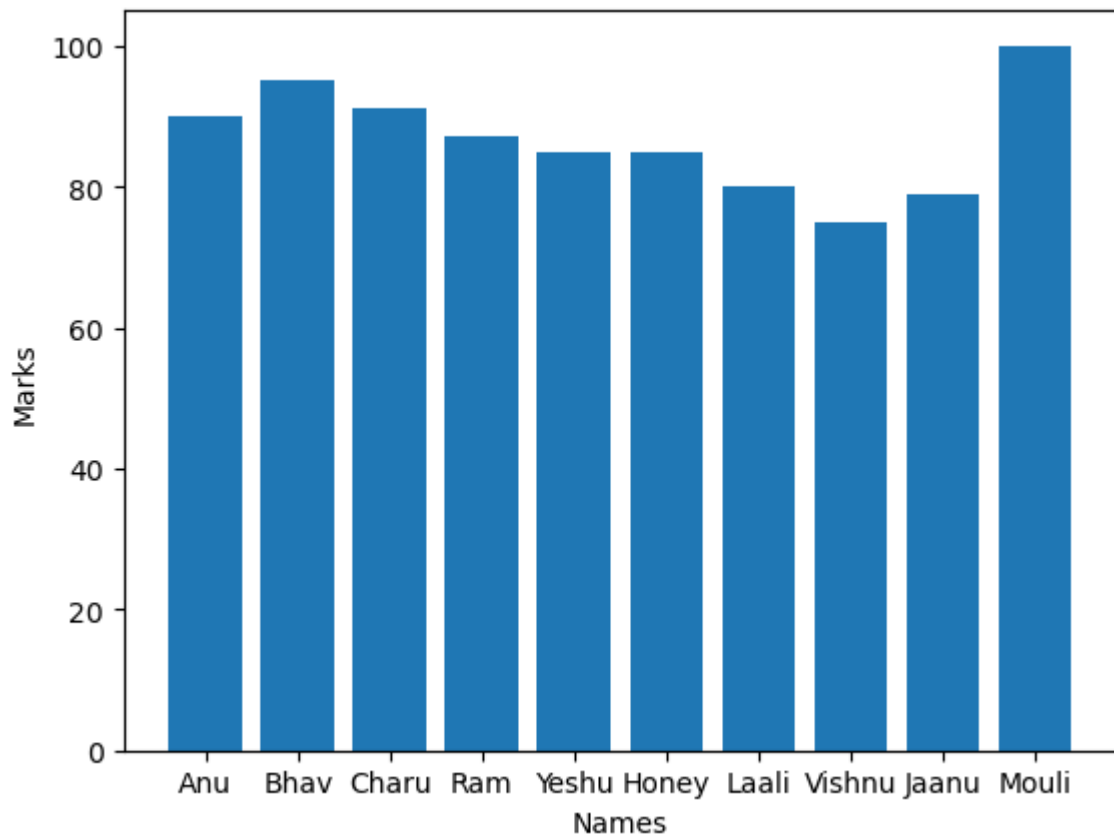


```
In [32]: ds.plot.barh(stacked=True)
```

```
Out[32]: <AxesSubplot:>
```



```
In [33]: plt.xlabel('Names')  
plt.ylabel('Marks')  
plt.bar(y,x)  
plt.show()
```

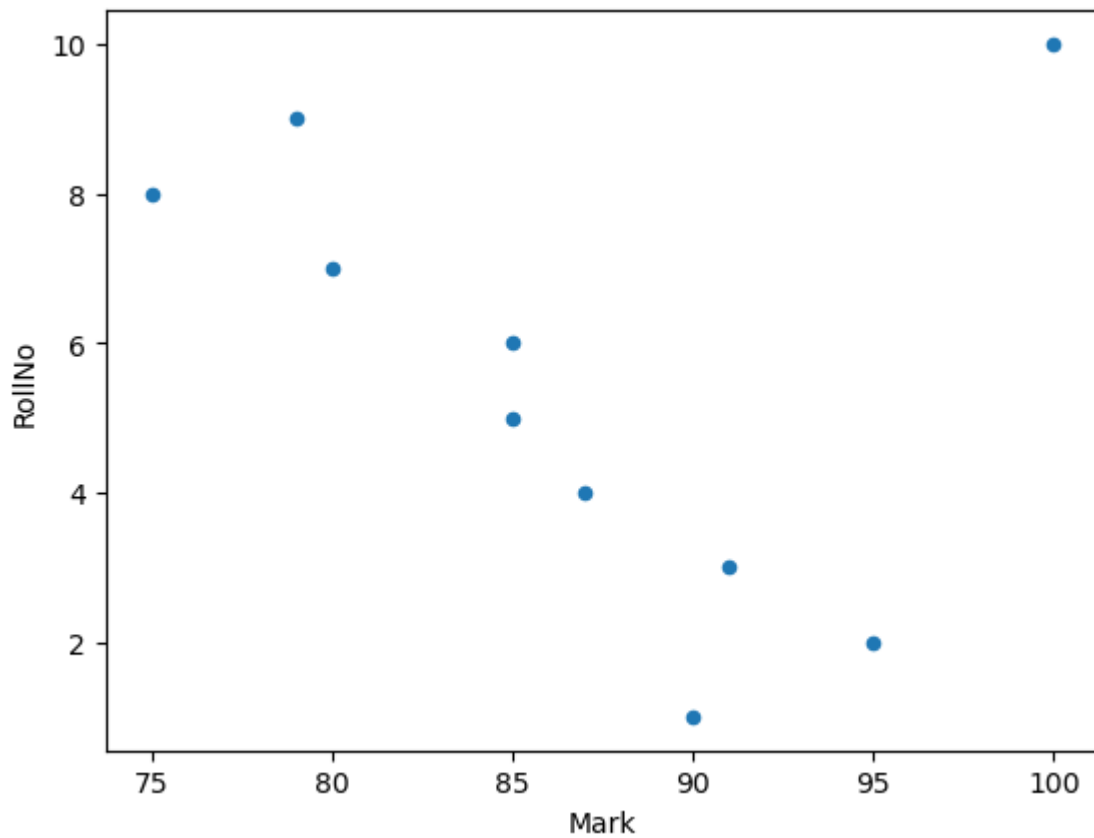


```
In [34]: ds.loc[:, 'RollNo']
```

```
Out[34]: 0      1  
1      2  
2      3  
3      4  
4      5  
5      6  
6      7  
7      8  
8      9  
9     10  
Name: RollNo, dtype: int64
```

```
In [35]: ds.plot.scatter(x='Mark',y='RollNo')
```

```
Out[35]: <AxesSubplot:xlabel='Mark', ylabel='RollNo'>
```



```
In [36]: ds['Mark'].max()
```

```
Out[36]: 100
```

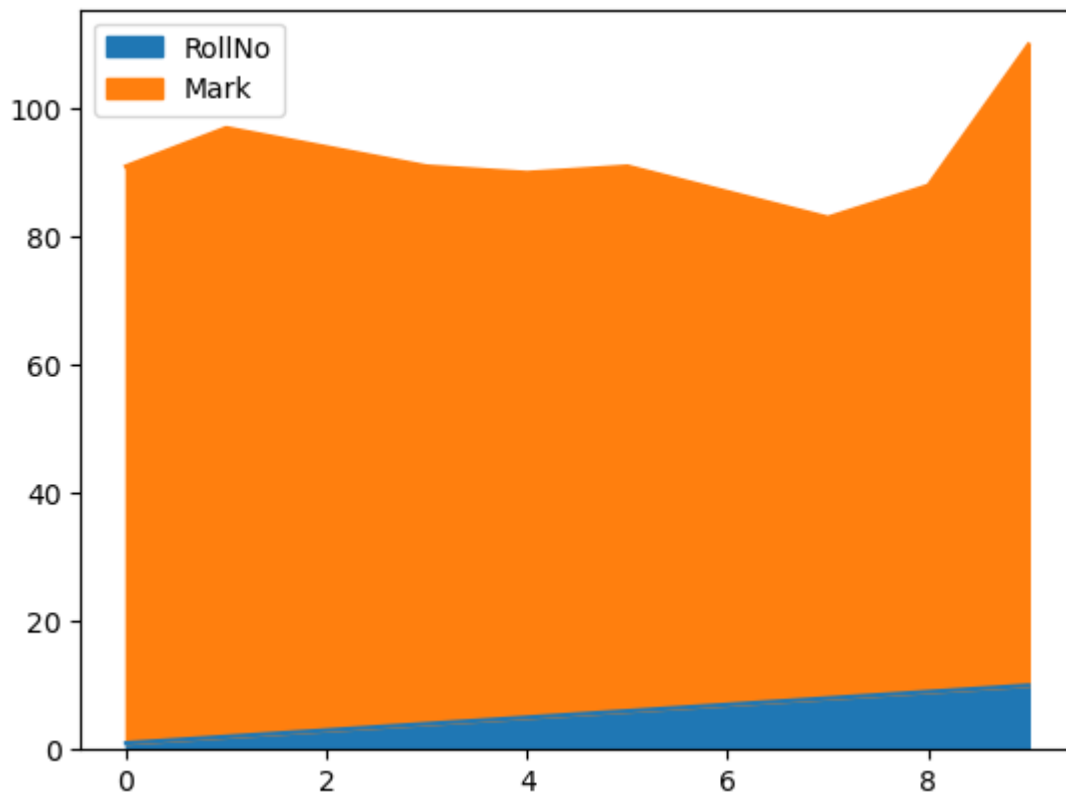
```
In [37]: ds['Mark'].min()
```

```
Out[37]: 75
```



```
In [38]: ds.plot.area()
```

```
Out[38]: <AxesSubplot:>
```



```
In [39]: ds['Mark'].mean()
```

```
Out[39]: 86.7
```

```
In [40]: ds.sort_values("Mark")
```

```
Out[40]:
```

	RollNo	Name	Dept	Mark	GPA
7	8	Vishnu	CSE	75	10
8	9	Jaanu	CSBS	79	10
6	7	Laali	Mech	80	10
4	5	Yesu	ECE	85	10
5	6	Honey	Civil	85	10
3	4	Ram	AIDS	87	10
0	1	Anu	CSE	90	10
2	3	Charu	IT	91	10
1	2	Bhav	EEE	95	10
9	10	Mouli	IT	100	10

```
In [41]: ds.isnull()
```

```
Out[41]:
```

	RollNo	Name	Dept	Mark	GPA
0	False	False	False	False	False
1	False	False	False	False	False
2	False	False	False	False	False
3	False	False	False	False	False
4	False	False	False	False	False
5	False	False	False	False	False
6	False	False	False	False	False
7	False	False	False	False	False
8	False	False	False	False	False
9	False	False	False	False	False

```
In [44]: ds.isnull().sum()
```

```
Out[44]: RollNo      0
Name          0
Dept          0
Mark          0
GPA           0
dtype: int64
```

```
In [45]: ds1=subset[['Name','RollNo','Dept']]
```

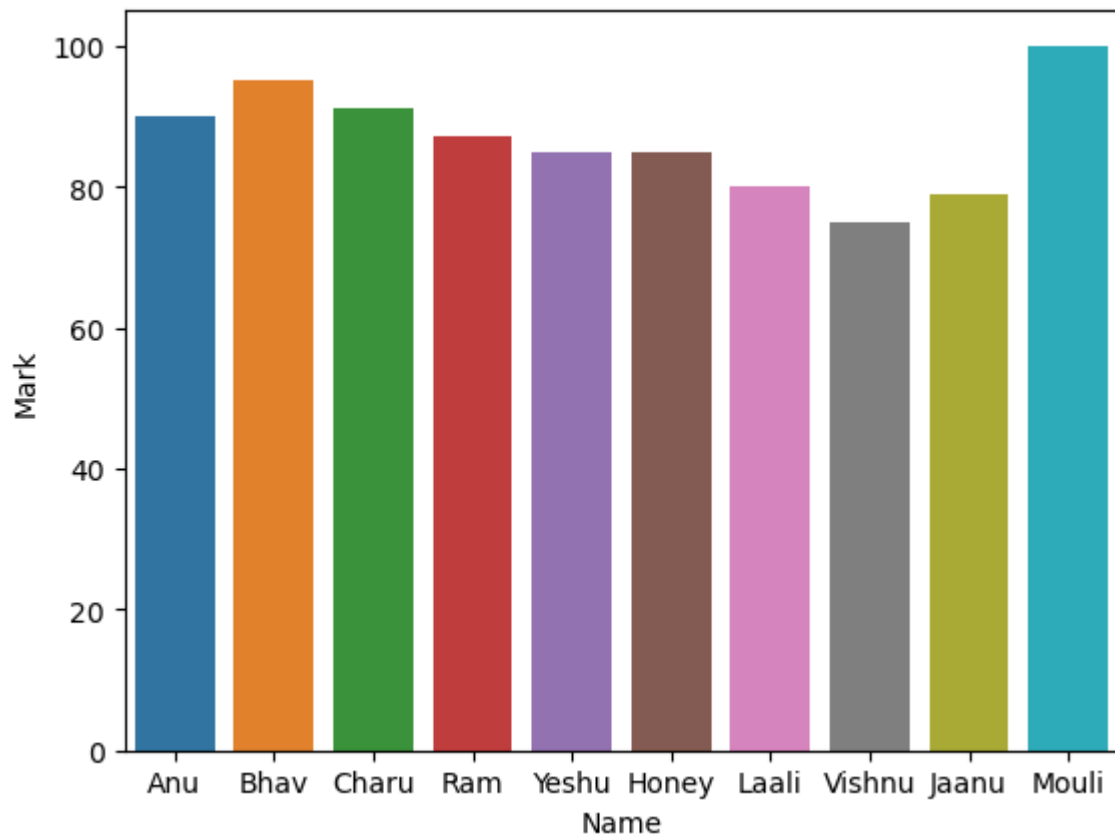
```
In [46]: ds1
```

```
Out[46]:
```

	Name	RollNo	Dept
0	Anu	1	CSE
1	Bhav	2	EEE
2	Charu	3	IT
3	Ram	4	AIDS
4	Yeshe	5	ECE
5	Honey	6	Civil
6	Laali	7	Mech
7	Vishnu	8	CSE
8	Jaanu	9	CSBS
9	Mouli	10	IT

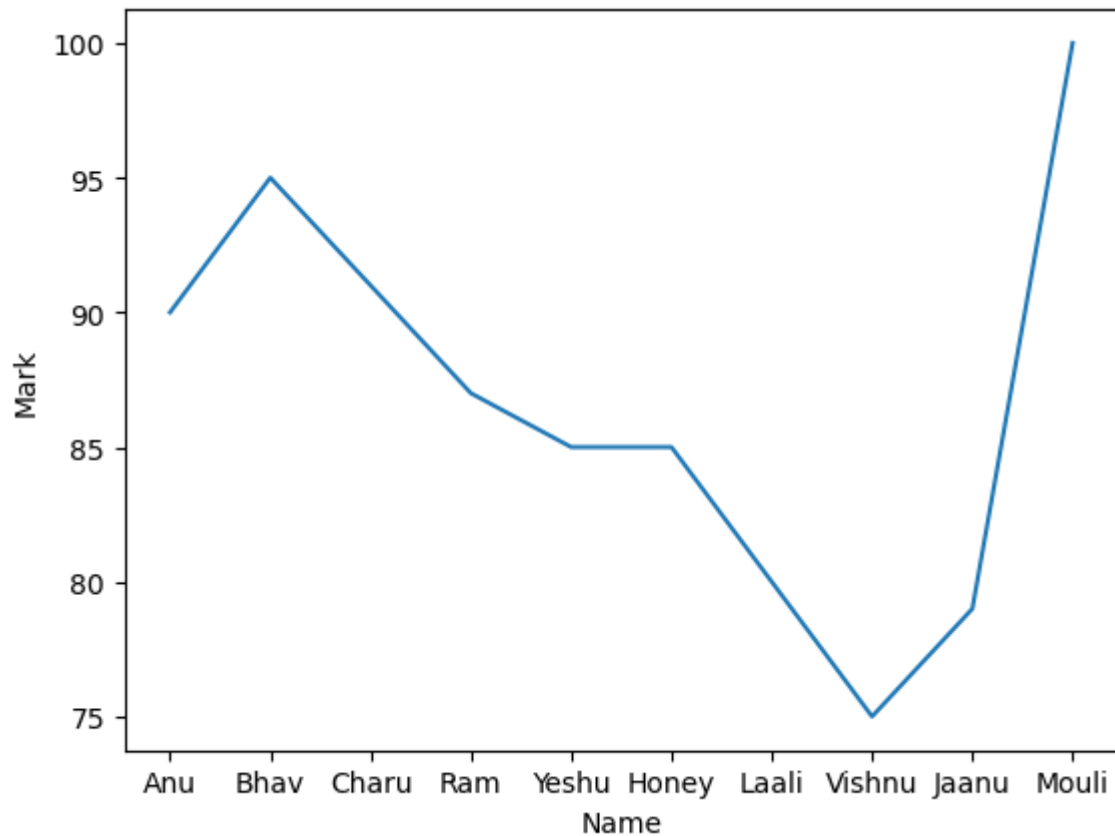
```
In [47]: sns.barplot(x='Name',y='Mark',data=ds)
```

```
Out[47]: <AxesSubplot:xlabel='Name', ylabel='Mark'>
```



```
In [48]: sns.lineplot(x='Name',y='Mark',data=ds)
```

```
Out[48]: <AxesSubplot:xlabel='Name', ylabel='Mark'>
```



In [ ]: